SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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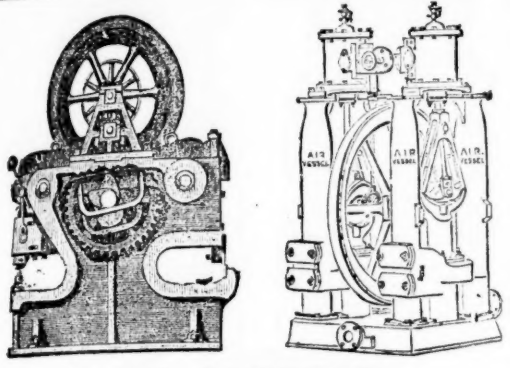

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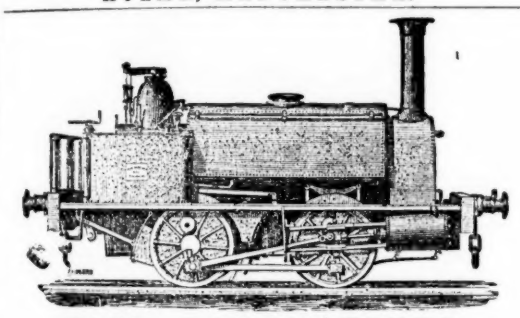

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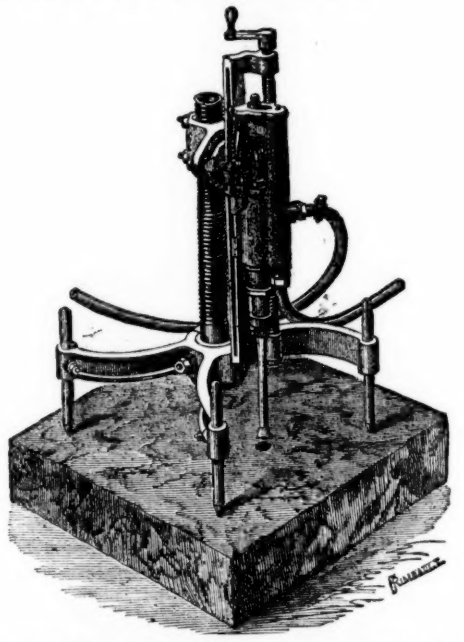

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COPY OF LETTER FROM SIR GEORGE W. DENYS, BART.

Draycott Hall, Richmond, Yorkshire, May 11, 1874.

DEAR SIRS,—Messrs. Jeffry and Nevin, of the Lead Hills Mining Company, came here from Scotland last week to see the borer at work in Sir Francis level. They went back highly pleased with what they saw. The level, which is just now going at £7 per fathom, they stated could not be moved at Lead Hills for less than £15. Five holes, between 6 ft. and 7 ft. deep, had been bored during the shift, and were fired together with 50 charges of dynamite, getting, as you may suppose, a tremendous quantity of stuff, and filling the level right up to the roof.

The old machine has been working first rate since you repaired it, and seems as good as ever. I think you will be hearing from Lead Hills before long, for seeing is believing. You can make any use of this you like.

Messrs. McKean and Co. Yours truly, GEO. W. DENYS.

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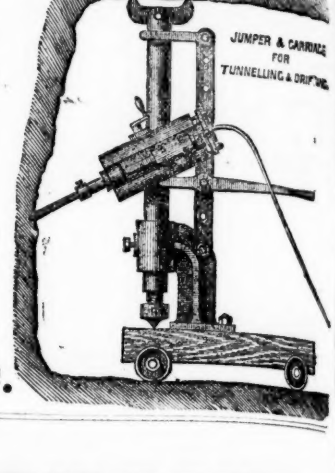

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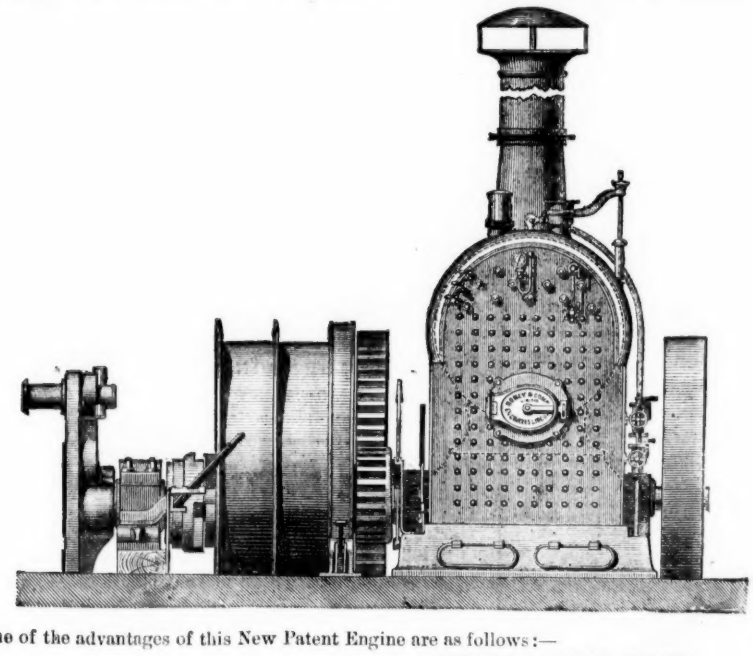

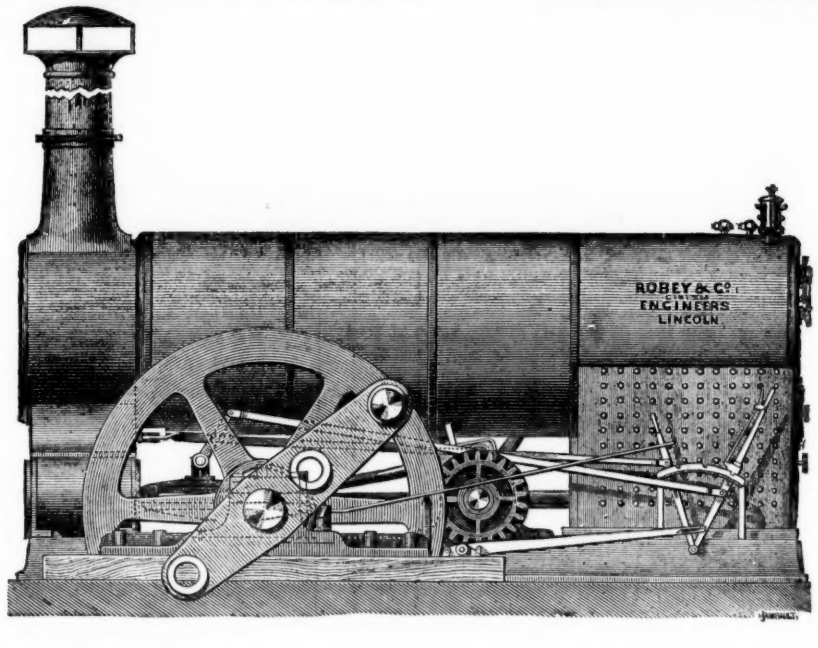

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This New Patent Mining Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable, in saving time and expense in fixing.

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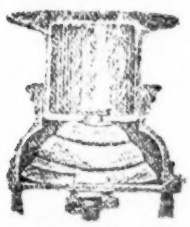

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STEAM BOILERS, AIR COMPRESSORS, and all other **MINING MACHINERY** supplied.
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J. G. CRANSTON, ENGINEER, 22, GREY STREET,
NEWCASTLE-ON-TYNE.

Original Correspondence.

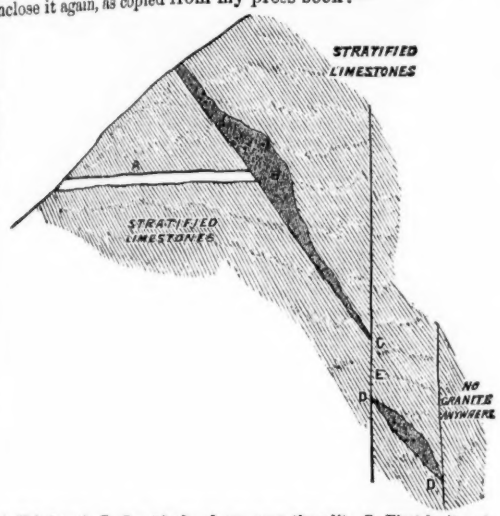
ROCK DRILLS.

SIR,—Upon reading the article by Mr. Jordan in the *Mining Journal* of last week on Rock Drills, we are prompted to speak again as to the desirability of an exhibition of such machines in London. There is no doubt but a considerable interest is felt in this matter by the proprietors and managers of mining operations, and if the machines could be brought together by agreement of the various proprietors for exhibition during a certain number of days, after being duly announced in the journals, it is probable there would be a large attendance of parties interested, and the adoption and purchase by many of such system as they should prefer. At the same time a tabulated statement of particulars could be made by the committee as to the speed of boring, the weight, size, and various dimensions, power required for working, number of parts, security of same against destruction by wear or accident, facility of repairing, facilities of manipulation and of adaptation, character of construction, materials used, quality of manufacture, prices, &c., that, no doubt, would be valuable information to the public, and advantageous to all concerned. We can see no reason why such an arrangement should not be entirely fair to all parties, and the expense would be small, inasmuch as London could be the most central and convenient place for a large majority of the exhibitors, and the machines for such purposes are supposed to be light and easy of transportation.

MCKEAN AND CO.

THE EMMA MINE.

SIR,—You have not given the cross section of this mine as I forwarded it in my letter of March 5, and published by you on the 28th. My diagram does not show any granite *anywhere*, neither do I believe that granite will be reached for some years yet in this mine. Possibly, to save time, you published what you believed to be the same cross section as mine, but there is a wide difference. I now enclose it again, as copied from my press book:—



A. Main tunnel; B. Great body of ore near the adit; C. First fault met with, cutting off all traces of ore; E. Perpendicular fault, 30 ft. high; D to D. The vein discovered again after the first fault, in November, 1873, from which about 1000 tons of ore have been sold, assaying from $1000 to $145 per ton.

Rumours have been propagated since the last rich discovery was made that granite had been reached; in fact, it was published in all the newspapers, which may have misled one of your correspondents to make the same assertion, but you will *not* find this to have been communicated to you by me in any letter or diagram. A large boulder of brecciated limestone was found on the ledge, near the new discovery, in the deepest workings, which was mistaken by some practical miners for granite. Therefore, it will be fair play to me if you publish my own diagram, where no granite is spoken of.

Salt Lake City, April 20. FAIR PLAY.

P.S.—Since my last communication some 250 tons have been sold; 150 tons assayed 293 ozs., and the balance about 170 ozs. In to-day's *Herald* you will see that no ore has been forwarded to Salt Lake for about a fortnight, but it is being accumulated in the ore-house, awaiting better weather and roads—for the last storms were the severest we have had. The fine weather we are now having will cause another 200 or 300 tons to be forwarded from this mine, and, no doubt, the concentration of the poorer ores will commence in about three weeks from this. It is estimated that there are some 70,000 tons. It is very strange that the Emma Mine (having no debts, except those to Mr. Park) having paid for its extensive concentration works, water privileges, and canals, for two new pumps and machinery, and with a floating balance of about $70,000, should be kept down to about 2*l.* per share, by nothing but a "freeze out game," as it is called in this country.

MINING IN COLORADO.

SIR,—You will have seen from the several letters I have sent you for insertion in the *Mining Journal* that, notwithstanding the many apparent failures of English adventurers in mining enterprises in Colorado, this Territory presents a most inviting field for the investment of capital in moderate amounts. Being thoroughly acquainted with mining, both in Cornwall and Devon, and for a long time resident in Colorado, I have for years noticed with astonishment the ignorance alike of mining and general business displayed in the selection and development of mining property by both American and English companies. In many instances really valuable properties have been purchased; but the companies have sent out agents who, by reckless expenditure on useless works above ground, have thus absorbed all the company's working capital instead of developing the mines in a systematic manner, and in many instances compelling the adventurers to close their operations before they were assured or not of the real value of the property. In other cases preposterously large amounts have been obtained by clever and unprincipled speculators from both American and English parties for mines that were almost worthless, and never could be made to pay a dividend on the smallest capital, notwithstanding that the best and cleverest men had the sole charge and control of their management.

In spite of all these drawbacks Colorado's mining industry continues to prosper and improve every year. Most of the prominent mines have been developed by their first owners, once poor men, but now (with but little aid from the capitalist) in easy circumstances. Among many instances I will notice the Pelican, because it is about the most prominent. This lode was discovered and prempted by a poor prospector, who gave a half interest in it to a friend (as poor as himself), to help him to develope it. During the last 12 months the output from this mine has averaged 10 tons per day of ore assaying from 150 ozs. to 800 ozs., but averaging 200 ozs. silver per ton of 2000 lbs. The Dives also, and the Pay Rock, on the same mountain, with many others scattered over the neighbourhood, have, likewise, been brought to their present height of prosperity by individual enterprise. If any further evidence of the value of Colorado mines were necessary, I would mention that two-thirds of the miners working in this county are working claims under lease, in most cases very profitably, paying 25 per cent., and occasionally 40 per cent., of the output as royalty to the owners. In how many mining camps throughout the world could this be done, especially when we consider the high price of labour and materials?

Most of the lodes here are held by poor men who would gladly give one-half of the property for as much development as would secure the owners a United States patent—an amount of work of the value of $500 being required. I, as well as hundreds of other practical miners, could point out many lodes here which would in every probability prove, by development, as good as any I have mentioned above.

Having stated these facts, I will now say that if I could succeed in getting a few persons in England to form a prospecting company, with but a small capital (say, $20,000), to operate on a number of lodes such as I have mentioned above, and on the condition described, it would be the most remunerative and certain investment in the market, and I have no doubt that in 12 months time the stock would be quoted at five times its par value.

Georgetown, Clear Creek County, April 20. DANIEL ROBERTS.

MR. JOHN HUNT, OF GEELONG, VICTORIA, ON MINING IN TASMANIA.

SIR,—Since my last communication I have again visited the tin mines of Mount Bischoff, and find some good tin ground has been recently opened, both as regards the alluvial deposits and what approaches a lode more than anything I had previously seen in that part. The tin-bearing portion is about 30 ft. in width, and although the tin ore is crystallised, mixed with crystals of quartz, oxide of iron, &c., well-defined walls are wanting, but it is possible that in sinking or driving it may assume more the appearance of a true lode, more particularly as it is situated in granite, proved to be so favourable for the production of tin ore in that part. A few hundred yards from this place I noticed a small vein or lode in a slate formation, the rich tin-bearing portion of which was about 3 inches in width, and it is by no means unlikely, if followed up, it may lead to something better; indeed, I am of opinion that good lodes will ultimately be found both in the granite and slate of Mount Bischoff and vicinity. As I was exploring for a private company, organised by myself and friends to test another portion of the mountain, I had very little time to examine claims in which we had no interest.

Judging from news I have recently received from England, it appears there is a fear that the discoveries of tin ore in this part of the world will soon glut the market; I must confess I do not quite see it in that light. Having travelled through the most important tin-producing districts of New South Wales, Queensland, and Tasmania, I have seen nothing to induce me to think that tin will be a drug in the market in consequence of the discoveries made in Australia or Tasmania. It is, however, perfectly true that there is a splendid show of tin ore at Mount Bischoff, but it must not be forgotten that this ore has to undergo careful manipulation before it is dressed up to a produce either to meet a ready sale in the English market or to be smelted on the spot.

In 1858 Mr. Robert Hunt's valuable Statistics showed that Cornwall and Devon produced 10,618 tons of tin ore, which gave 6920 tons of metallic tin, or a little over 65 per cent. on the whole. I am inclined to think that practical experience must be brought to bear on the treatment of the ore in this part before such a produce is got here, or any good result can be expected. I do not for a moment depreciate the intelligence of men in Australia or here; on the contrary, they are, as a rule, quick to learn, but they *have to learn* particularly all that pertains to mining, except gold mining, which is pretty well understood in the colonies, and will, I think, from the quantities of gold recently found in Tasmania, ultimately be a success. The iron mines here, of which I spoke so favourably some time since, have come to a temporary stand, through the want of a practical smelter to work the furnaces. The iron ore appears to me to be good, and to be found in large quantities. The penny wise and pound foolish proverb is not out of place in many things done in mining matters.

With regard to the quantity of properly dressed tin ore that could be sent from Mount Bischoff during the next six months, if properly managed, it would be about 400 tons, but it must not be forgotten that the winter is close at hand, which may militate against the progress of the works at the mountains. JOHN HUNT.

Tasmania, March 21.

THE PESTARENA UNITED GOLD MINING COMPANY.

SIR,—I would not ask you to afford me a small space in the Journal for the discussion of a personal matter were it not that I must necessarily touch upon subjects interesting to a large number of your readers who are shareholders in the Pestarena United Gold Mining Company. From September, 1868, to May, 1871, I managed the Pestarena United Mines, in Italy, and, although at the commencement of my term of office the mines were losing heavily, yet I managed to bring them through, and to make a small profit in each year, and to create large reserves of discovered ore, particularly at the Val Toppa Mine, of 8 dwts. and upwards per ton, as a basis for future successful working. I may state that, from financial reasons, my task was a very difficult one. From the middle of 1871 I have had no connection with the Pestarena United Gold Mining Company.

From June, 1871, to the present time the mines have been managed by Messrs. John Taylor and Sons, assisted by Mr. C. J. Harvey, as superintendent. These gentlemen, as I gather from their own reports, have not been very successful in their management. They appear to have pretty nearly exhausted the reserves of good ore of 8 dwts. and upwards per ton at the Val Toppa Mine, without replacing them by discoveries of equal value, and upon the general working account have lost 4510*l.*, and the Val Toppa Mine has almost to be re-made.

The complaint upon which I trouble you is against a portion of a speech reported to have been made by Mr. R. Taylor, one of the managing directors, to the meeting of shareholders, held on the 23d ultimo, and reported in the Journal of the 25th ultimo. I did not see the Journal until yesterday, or would sooner have replied. Mr. R. Taylor is reported to have said—

"The Chairman had alluded to the falling off in the quality of the rich ores Those ores were found in the side lodes at Val Toppa. They were an irregular sort of formation, upon which no miner, he believed, would ever think of placing much dependence. During the last twelve months those ores had 'given out,' so that what remained was the large quantity of ore in reserve; this had always been stated at a very large figure by the former superintendent, Mr. Dean. He (Mr. Taylor) did not believe the quantity had been overstated, but its richness was not equal to the estimate. Mr. Dean had stated that no ore had been taken into account that produced less than 8 dwts. per ton, whereas they found a great deal of it did not produce more than 6 dwts."

In this last sentence there is a strange jumbling of things past and present. My estimates referred to the reserves as they existed in the early part of 1871; but the eyes of the mine have been picked out since, and now my estimates are made to apply to the reserves as they exist in 1874, when only the refuse is left. Mr. R. Taylor does not mention any particular document of mine to which he refers; but I will say that I never framed any estimate of the reserves at the Pestarena United Mines otherwise than upon one definite principle—1st, ores of 8 dwts. and upwards per ton, fit for treatment in the Francfort Mills; and, 2nd, ores of 8 dwts. and under per ton, which were too poor for the Francfort Mills, and were called "stamp ores." The former were estimated in detail, and the latter in block, and I will prove the accuracy of my estimates through Messrs. Taylor themselves. Mr. R. Taylor does not dispute my quantities, and here is the proof of the quality. Three annual reports have been published under the auspices of the Messrs. Taylor, for 1871, 1872, and 1873. Referring to the tabular statements of mill performances, I find 15,800 tons of Val Toppa ores were milled in those three years, and the average produce of bar gold per ton of ore milled is stated as follows—1871, 14 dwts. 18 grs.; 1872, 9 dwts. 14½ grs.; and 1873, 8 dwts. 8 grs. The average produce of bar gold per ton is also given for each of the 36 months referred to, and there is not even a trace of any 6 dwts. ore having been milled. Whence were the 15,800 tons of ore milled derived? Why nearly all from the reserves of 8 dwts. and upwards per ton estimated by me in the early part of 1871. Is it possible to estimate large masses of unbroken auriferous ores more closely?

Now, as to the stamp ores of 8 dwts. and under per ton. In my published report, Oct. 23, 1869, p. 16, occurs the following paragraph:—

"In the Val Toppa, Acquavita, and Peschiera Mines there are about 50,000 tons of stamp ore laid open, and estimated to average 6 dwts. of gold through the mills—say, 15,000 ozs.—which are not taken into account, as they can only be worked advantageously when the stamps and other appliances are completed."

I am pleased to have Mr. R. Taylor's confirmation of the accuracy of my estimate, because he says "they found a great deal of it did not produce more than 6 dwts. per ton," and I should think he was the only person surprised at that result. But I imagine Mr. R. Taylor has in some way confounded my estimates with those of Mr. Harvey, because Mr. Harvey reports, Oct. 30, 1871:—

"The quantity of ore in sight at this mine (Val Toppa) on Sept. 30 amounted to 40,000 tons, estimated to be worth 8 dwts. per ton."

I will only observe with regard to the estimates of reserves, &c., that neither Messrs. Taylor or Mr. Harvey have ever said that they were acting upon my figures, but have propounded all their estimates as of their own knowledge; and it is a universally recognised principle that if a man makes a statement without giving his authority he is bound by any statement he makes as his own.

From a prosperous state the Val Toppa Mine has drifted into "Queer-street," and I am not at all anxious to share in the honour of the *fiasco*.

According to the last annual report, almost the only chance for Val Toppa hangs upon the successful issue of the new stamping arrangements, and of the subsequent Australian processes to be adopted. We shall know more about them in six months. But a broad question must be looked in the face, which is—In the event of the new processess not answering well, is there any chance for the mine? In my opinion there is, if the mining operations are conducted according to the nature of the lodes and of the enclosing rocks, and the reduction processes according to the nature of the lodes; but if it be attempted to "violate nature" by dealing with them after Australian precedents, applicable to a very different state of things, there will probably be a great failure.

Mr. R. Taylor tells us that the so-called side lodes at Val Toppa are a sort of irregular formation, "upon which no miner, he believed, would ever think of placing much dependence;" but, before we blow upon the side lodes, let us see what they have done for the original Val Toppa Company and for the Pestarena United Gold Mining Company:—

1864 to 1873—The great quartz lode yielded gold	Ozs. 2,484
1868 to 1873—The side lodes yielded gold	15,429

The great quartz lode has been very little wrought since 1868, because its ores depend for successful treatment upon means yet to be created, whereas the ores from the side lode are more tractable and can be treated in the Francfort Mills.

Upon the question of the possible recovery of the mine, Mr. Harvey says, Feb. 9, 1874:—

"Whether similar deposits of mineral may again be discovered in Val Toppa is a question yet to be solved, as yet the workings may be said to have scarcely penetrated beyond the skin or face of the mountain; but what an amount of gold has been won! Why should not other deposits of ore exist equally valuable?"

Leaving out of consideration the notes of admiration and interrogation, let us see if better reasons may be found. The side lodes are not to be depended upon at and near to their departure from the great quartz lode, but it is probable that farther in the mountain, and in the right ground, they will become the most valuable lodes in the mine. Whatever their demerits they are the lodes of the country, and must be dealt with according to their nature. The great quartz lode itself is but a huge lenticular mass of quartz, one of a string of similar but smaller masses which cross the mountain; the great quartz lode itself was "thinned out" in the southern part of the mine, and whatever chances remain in that direction depend upon the side lodes. There are two kinds of rock in the mountain—mica slate and talcose slate. In the mica slate the lodes are invariably poor; in the talcose slate they have made all their riches. In my report, Sept. 18, 1868, the situation is exactly described, thus—

"In the first 150 metres in each of the four upper levels the main lode is very poor, the rock is mica slate, then they enter a band of the 'kindly' talcose slate, and they immediately become rich; the talcose slate band extends 170 metres south, in the levels, and to that extent the good ore ground, with many subdivisions, lasts; then the walls change to mica slate, and the lode becomes poor, and is now poor in all the ends which have penetrated so far, and will remain poor until they have reached a second band of talcose slate, which is known to be dipping down before the ends; when that is reached there will probably be a second range of ore ground extending from the surface down through that part of the mine."

As predicted, a long range of blank ground has been passed through; however, better days are in store, and I hope the ore lately reported as having been cut in the end of the fourth level south, and worth 1 oz. 6 dwts. per ton, is the commencement of the predicted second range of ore ground.—*Milan, May* 7. ARTHUR DEAN,
Late engineer-in-chief, Pestarena United Gold Mining Company.

CAPE COPPER MINING COMPANY.

SIR,—In reply to the correspondent in last week's Journal, the extensive property owned by this company, including their several mines, is all in the Cape of Good Hope colony, about 300 miles north of Cape Town. The mines are about 80 miles from the coast, and where the British laws are administered in the same way as in any other part of Her Majesty's dominions, in consequence, where your correspondent will see, there is ample security to life and property; and as regards stockbrokers' opinions, I am not aware they could have any means of obtaining information which is not open to the public, as on the arrival of each mail the directors at once send to the Stock Exchange and the newspapers slips containing the pith of the advices received from the mines, and the shareholders are thus put in possession about three times a month of the latest news respecting their property, and the details of which can be seen at all times at the offices of the company, as the system of management by the directors admits of no secrets, the fullest information, as well as the books, being open to all. The directors, besides, publish a monthly statement, embodying the advices they have received of the month, and the arrivals of ore and sales at Swansea, and, therefore, the public have the means of judging for themselves.

The Cape Copper Mining Company, like all other mining companies, have experienced very many vicissitudes, but they have now, happily, surmounted all difficulties (the principal of which was the transport of ore to the coast) by the construction of some 60 miles of railway, and, notwithstanding the persistent attacks of the "Bears" and others to depreciate the stock (and which invariably ended in their discomfiture, owing to the shareholders having too much confidence in the ultimate success of the undertaking to part with their shares), the value of the shares for a long time has been tending upwards, and at times steady when the share market generally has been in a state of panic.—*London, May* 13. A SHAREHOLDER.

ORE-DRESSING MACHINERY.

SIR,—The letter of "M. P.," in the Supplement to last week's Journal, on the above subject, is, in every respect, so apposite, that much more need not be said in confirmation of what has been written by that gentleman. Facts are the best exponents on all such points of practical mining work, and the two cases cited in proof by your correspondent—the Stonecroft and Rhoswyddol dressing-floors, although there are several others of the same kind now laid down—are incontestible evidence of the superiority of Green's Patent Dressing Machinery over every other system.

I have had nearly 40 years' experience in this department of engineering, and have put up more ore-dressing machinery than any other single man in the North of England, such work commanding at the time the highest praise and commendation; but I must be candid enough to confess that the "patent self-acting classifiers" and "hutches" for the crushed stuff, and the "saddle-back classifiers" and "rotary buddles" for the slimes ought to, and must completly, set aside all the old-fashioned processes which have hitherto been in use—yet it is wonderful with what tenacity old systems are retained and perpetuated, nothwithstanding the immense saving which results from the application of well conceived and successfully executed designs.

About three years ago I visited the Great Laxey Mine and dressing-floors, and so diffuse, imperfect, wasteful, and expensive were the dressing operations that I submitted to Capt. Rowe, who was then acting officer, the plans of the Patent Self-Acting Mineral Dressing Machine Company (Limited), having such plans with me, when he promised them his attention and consideration, but I have never heard anything further from him. Had this machinery been then adopted, the Great Laxey dressing-floors would now have been of a very much superior character, and a large sum of money saved to the shareholders. This Patent Self-Acting Machinery saves at all ends. It reduces labour to a minimum, and scarcely a trace of waste need be discernible from any of the different processes.

The great secret of this satisfactory state of things lies in the perfect cleansing and classification of the different sizes of crushed stuff

before going to the hutches. All the sludge and slime matter being got rid of before going to the jigging process, and all the different sizes going at once, separately and distinctly, to their own respective sieves and tubs, under a complete self-acting process. This arrangement of machinery is capable of any amount of extension, and can be made to dress most perfectly any quantity of crushed stuff in much less room and time, and at a far less cost, than any other mode I know of.

"Subscriber," in last week's Journal, can satisfy himself of the correctness of these statements by a visit to the Stonecroft, Rhoswyddol, or the new dressing-floors lately put down by Mr. Bainbridge, Middleton House, Barnard Castle, the manager of the London Lead Company's Mines and Works in Teesdale, Alston Moor, and other districts; or if "Subscriber" will apply to Mr. George Green, engineer, Aberystwith, S.W., or myself, he can have the fullest information.

C. DODSWORTH,
Haydon Bridge, Carlisle, May 11. Mining and Consulting Engineer.

DRESSING-FLOORS FOR LEAD.

SIR,—In reply to the enquiry of "Subscriber," in the Journal of May 9, he cannot do better than visit the admirable new dressing-floors recently constructed and fitted up in the most complete and approved manner at Roman Gravels Mine; and, also in the same neighbourhood, the new self-acting dressing machinery, now successfully working at Bog Mine, where there is a large proportion of blende mixed with the lead ore in the lodes. From my own experience of the obliging courtesy of the manager, I may safely presume to assure him that in such a visit he will be afforded every information they can give him on the subject. The nearest railway station to Roman Gravels Mine is Minsterley, the terminus of the branch line from Shrewsbury; there is then a four mile walk or drive along a well-kept and most picturesque high road to the mine; and a further distance of about three miles through pretty cross-country lanes to Bog Mine, from which a road leads either back to Minsterley or on to Bishop's Castle Railway Station. A. B.

KALOSIC GAS.

SIR,—No one can regret more than I do to perceive that the advocacy of kalosic gas is assuming the questionable form of invective; self-respect, however, does not permit me to reply to such expressions as "untrue," "invidious," "illogical," or the accusation of "garbling." In a very few words, I will endeavour to reduce the whole question to figures, which will require some direct answer or explanation; none such has been vouchsafed to any single assertion I have made in my previous letters on the subject. I shall first explain. I did not assume that Mr. Baggs ever wrote, in so many words, that air or kalosic gas were definite chemical compounds, but the inference is irresistible when he hazarded the following statement:—"I say without fear of contradiction that the proportion of the gas present (in kalosic gas) is and must be either 1 to 4 or 1 to 2, and experiment as well as theory proves it to be the latter. The very supposition (of any other proportion) is in open rebellion against the whole fabric of volumetric chemistry."

If the proportion *must be* 1 to 2, and volumetric chemistry is against the *very supposition* of any other proportion, it can only be because the compound is chemically definite. Let us see how Mr. Baggs's results tally with this. He says he obtained 220 000 ft. of kalosic gas from 1 ton of coke; this would contain, according to his dogmatic *dictum*, 73 333 ft. of carbonic oxide, equal at 30·21 grs. per 100 in. to 5463 lbs. But this quantity requires *more* than a ton weight of pure carbon, and, as coke never contains even its full percentage, it is perfectly clear that Mr. Baggs thought he could show more than the coke could give. H. C. BARTLETT, F.C.S.

Gray's Inn, May 12.

KALOSIC GAS—No. IV.

APPLIED TO RAISING STEAM.

SIR,—In this letter I would direct the attention of your readers to the dawn of a new and important era in the development of the steam-engine. The united efforts of the engineering world have hitherto in this respect been mainly concentrated upon the improvement of the ponderous and elaborate mechanism for applying and directing the resistless force of steam to every variety of useful purposes for which it is suited. The more tangible accessories of the engine, and the character and disposition of the masses which constitute its anatomy, have been the chief objects of study, as promising to man more certain and effectual aid in his ceaseless struggle to obtain a mastery over the elements of Nature. The extension of heating surface and all the known physical properties of steam have been successively enlisted into active service. Tubular construction, spheroidal generation, percussive action, super-heating, expansion, and both direct and surface condensation have all been subsidised and applied in such a vast variety of forms and methods that their developments are almost in number like the leaves of the forest; and, regarded in the aggregate as a mere part of the whole structure, they seem to form a very kaleidoscope of engineering. But when we come to the fountain head of all this mighty motion, to the fire, to the vitalising spark which throws the whole machine into activity, we find that during the last hundred years—nay, even from the days of the Marquis of Worcester—the spirit of improvement has been wrapt in a deep sleep.

When the gentle and glowing flame, or it may be the roaring furnace, summons those countless legions of iron horses to shake their harness, and put forth their overwhelming strength to battle with the winds and waves, or to throw back the deluge of waters from the deep and flooding mine—the bidding is that of Vulcan, and not of Mercury. The fabric of modern chemistry, which has enriched almost every department of manufacturing art and applied science, has scarcely as yet even touched the steam-engine. As men burnt the crude fuel in the early days of steam-power, so do they burn it now. They looked then and look now to the movements of masses, and neglect the vibrations of invisible atoms, upon which those movements depend—hence it is that so much good fuel burns away to waste even in the best engines; hence it is that the bowels of the earth are ransacked of their treasures by the toil and sweat of a standing army of busy miners, that more than half the result of their most valuable industry may be afterwards thrown away in the old and wasteful system employed in its consumption. But the remedy for this great and crying evil is all within the scope of modern chemistry. All this fearful loss, amounting in the United Kingdom alone to *many millions of pounds sterling annually*, may be truly and really *saved* if engineers and others interested in the question will only set aside the prejudice arising from opinions which are based upon the errors of custom, and will carefully and dispassionately examine the facts which I am now about to lay before them.

This burning of fuel in the furnace of an ordinary steam-boiler is invariably attended with great waste, because the fuel is consumed in the mass, and under circumstances which do not admit of that uniform control and adjustment of the forces concerned, the presence of which is so indispensable to the perfection of chemical action. However good the management or careful the stoking, the evils inherent in the system still remain, and give rise to enormous loss. The unequal distribution of fuel, the want of a refined method, regularity, and specific diffusion in the supply of atmospheric air, together with the wide variation of combustive intensity in different parts of the same furnace, render the calorific results capricious, and cause, as is well known in practice, an immense proportion of the carbonic oxide and hydro-carbon gases liberated by the destructive distillation of the coal to pass through the flues into the air wholly unburnt, and therefore without giving up a fraction of an equivalent to the total sum of heat and motive-power actually produced.

Suppose we are dealing with 1 ton of fuel, and let us in the first instance consider this fuel to be coke, or commercial carbon. If this ton of coke is burnt under the conditions above stated more than half the heat and useful effect due to its chemical and physical attributes is completely lost and thrown away. But let us go a step further; let us convert the whole of this ton of coke into gas—permanent gas, capable of being placed under absolute control in regard to the conditions of its combustion, and of being burnt in ordinary gas-burners, or suitable modifications thereof, either with or without the previous admixture of atmospheric air. Under these altered circumstances the whole of the gas is fairly, literally, and completely burnt, and all the heat-giving powers of the fuel are saved. These facts may be questioned by some people, or denied altogether by others. They may say, as some have already said to me, "Here is 1 ton of coal or coke, whichever it may be, you cannot convert it into 2 tons." True, I know I cannot. I have neither the wand of Prospero, nor the legerdemain of Houdin, nor is it given to any man to make or to destroy a single atom. I merely endeavour to show that under the present system of burning fuel and raising steam the potential energies at our command are literally thrown away and scattered to the winds; and that by resolving an equal weight of the same fuel into kalosic gas this terrible waste may be averted, and almost every atom of the mass may be utilised and made to render its full equivalent of valuable duty. My magic and mystery extend no further than this. However, I will try to place the matter in a still more plain and popular form.

It is notorious that a vast amount of fuel is wasted in these and similar operations: nobody denies that. In the general average of steam-engines, even of the best construction, it is a fair estimate to say that 1 ton of coal will not evaporate more than 5 tons of water. But the theoretical limit of possible evaporation universally recognised by engineers is 13 tons of water by 1 ton of coal, an estimate based on the most careful and repeated experiments of many of the first chemists and philosophers whose names stand upon the broad rolls of science; experiments varied in every possible way, conducted under most elaborate arrangements, and tested in every case with the utmost severity by the most rigorous measurements and calculations. In fact, this relation of 13 grammes, or 13 tons of water vaporated by 1 gramme, or 1 ton of coal consumed, is nothing more than the simple expression of the work actually done and accomplished by these enlightened physicists and experimenters.

But what does it all mean? Thirteen to one? It means that of all the coal consumed in the boilers of steam engines we get a total result of 5 instead of 13. It means that of every 1300 colliers now engaged with their employers in a constant and lamentable wrangle over a fraction of wage, no less than 800 of the number, when at full and earnest work, are toiling for no tangible result, are all throwing away their labours to the unrequiting air. It means that for every five mines at work there ought to be 13; or, generally and finally, it means that of every 10 000 horses whose movements and energies are derived from steam more than 6000 of the number are from year's end to year's end locked close up in the stable, and in the same proportion the general industry, the trade, commerce, and political power of the country are locked up also.

The conversion of solid fuel into gas is the only key that will unlock these powerful forces, and change the aspect of affairs from wrong to right, for with gas we have the means of insuring perfect and complete combustion, and so obtaining from the fuel its full equivalent of duty. But to render this gas available in practice it must be wonderfully cheap, and very easily prepared. Now, the preparation of kalosic gas is simplicity itself, and where else can we find, or hope to find, a powerfully inflammable gas, capable of being made with ease, and with any required degree of rapidity, at so very low a price as 2d. per 1000 cubic feet. ISHAM BAGGS.

CARRIAGE OF EXPLOSIVES.

SIR,—One of the most important questions for the consideration of the Committee now sitting on Explosives is that relating to transport and carriage. The safety of the public and the interests of trade are alike involved in it; the former to an extent not generally known. The railways, having driven all stage wagons and common carriers off the public roads, have acquired a complete monopoly of the inland carrying trade of the country. All competition having been put an end to, they are enabled to dictate just such terms to the public as they think proper, and that there may be no rivalry, or competition, *inter se*, the traffic managers have constant meetings at the railway clearing office to regulate the carriage of goods, and to determine what shall and shall not be carried on all the railways in the country. The body thus constituted, knowing their power, appear to be guided by the most narrow-minded protectionist policy, particularly as regards the carriage of explosives.

The trade in gunpowder is so large that they are compelled to carry it, but they charge a rate equal to five times the rate payable according to the Railway Acts on first-class goods, and they require that 2 tons shall be sent at a time, or rather, to be paid for the carriage of the smallest quantity as if it weighed 2 tons. The effect of this narrow-minded policy is just what might be expected. Gunpowder and other explosives must be had, and as the railway companies will not carry them openly, they constantly carry them under disguised descriptions, and without those reasonable precautions against accident being observed which the safety of the public requires. The slightest reflection will show this to be so; gunmakers and dealers in ammunition receive orders for the supply of 10 or 20 lbs. of gunpowder, or a few thousands of breach-loading cartridges. What are they to do? The only public conveyance is the railway. But the railway company will not knowingly carry so small a quantity of powder unless paid ten times the value of the order. The tradesman has no alternative; to plead the circumstances, and refuse to execute the order, is to abandon his business and shut up shop. His only course is to dispatch a parcel by railway without declaring the contents, or declaring part only of the contents, without mentioning the powder.

The same system is also carried on to a considerable, but much more limited, extent by parties who are interested in and require the use of the more powerful explosives for mining purposes, and no prohibitory laws will prevent it. Gentlemen, respectable tradesmen, and mine and quarry owners and managers, would infinitely prefer paying reasonable, and even high, not to say extravagant, rates for the carriage of the explosives they require, but railway managers will not allow them to do so, and they, consequently, are driven, in most cases sorely against their will, to practice or connive at some deception, and get them carried as they can.

The short sightedness and impolicy of the present railway regulations are apparent, and the safety of passengers, and the interests of trade alike require some radical change. If railway authorities are so blind to their own interests, and the interests of others committed to their care, the Legislature ought to step in and provide the remedy. The root of the mischief is the monopoly the railways enjoy. They have acquired it through the favour of Parliament, and they ought to be compelled to use it reasonably and fairly, in the interests both of the public and of their shareholders. At present they appear to be regardless of the interests of either. They lose the advantage of high rates for the carriage of explosives they must know they are constantly carrying under fictitious descriptions, and they cause the safety of their passengers, as well as their own property, to be endangered, by compelling, and thereby fostering, the carriage of explosives without those precautions which would be observed if this smuggling were put an end to. The remedy is very simple; let railway companies consent to carry gunpowder and other explosives at fixed times, say once a week, or even fortnight, and at high, but not prohibitory, rates, and the present smuggling would be ended. The railways would receive three or four times the rates they now get for the considerable quantities they at present carry, and those quantities would be greatly increased, while on the other hand the carriage of explosives by passenger trains would be put an end to, and all due and proper precautions against accidents might be taken. The railway goods traffic being conducted exclusively by the servants of the companies, without coming in contact with the general public as on ordinary highways, and the introduction of the block system, now so generally adopted, seems to be specially adapted for the safe carriage of explosives, and no accident could occur except from the greatest and most culpable carelessness.

Accidents have occurred, and will no doubt again occur, from the carriage of petroleum and other commodities which are well known to be much more dangerous to carry than any of the explosives I have named; and yet the railway managers do not object to carry petroleum, and it is a remarkable fact that no accident has ever arisen, and this, notwithstanding the smuggling of carriage and consequent want of precautions I have referred to, from the carriage of any explosive except gunpowder, and then only when it has been duly declared and knowingly carried in large quantities, having by the united wisdom and foresight of the general body of traffic managers been placed at the tail of the train, and run into by an engine of another train, where the block system was not in operation.

Tavistock, May 13. FREE TRADE.

EXPLOSIVES.

SIR,—In my letter last week I was enabled, by your courtesy, to draw attention to the restrictions and irregularities of the present Acts regulating explosives, and I now desire, with your permission, to place before your readers a summary of the remedies proposed by Major Majendie, Her Majesty's Inspector of Gunpowder Works. Practical miners will know how far and in what direction legislation is necessary, and will have to consider whether they are more likely to gain an increase of facilities, or to be hampered in their operations by the proposed change in the law. I am anxious that practical men in various parts of the country should give their opinions and experience through your columns, for discussion should precede legislation, and not be put off until an Act of Parliament has settled the law for some years to come.

Major Majendie, in his evidence before the Parliamentary Committee now sitting, proposes to repeal all existing Acts and Law Acts relating to gunpowder, nitroglycerine (including the present obnoxious Nitroglycerine Act of 1869), dynamite, guncotton, ammunition, and fireworks, and to frame a new and comprehensive Act, embracing all explosives, in their place. To allow the manufacture of explosives, whether ganpowder or otherwise, and the operations connected therewith, to be carried on under a "common" or a "special" license, except the mere filling of sporting or of blasting cartridges, which can be carried on without a license, but under "regulated precautions;" and without a common or a special license no person will be permitted to *sell* gunpowder or any other explosive. Common licenses for the sale of explosives (subjecting the holder to Government registration and supervision) are to be granted, as a matter of course, upon proper application to the licensing authority. Common licenses are to be of two sorts—common retail licenses for sellers, and common magazine licenses for mining stores; the former to allow of a maximum of 300 lbs. of loose powder to be stored, the latter a maximum of 2 tons of gunpowder, or 1 ton of dynamite or of guncotton, according to the conditions of storage and the distance from surrounding places. But special licenses will also in some cases be granted for the storage of larger quantities, the distances and quantities to be determined by the Inspector, and not to be fixed by statute law. Common licenses to be granted for a limited period not exceeding five years. Special licenses for manufacturers not to exceed 30 years, or for such less term as a surrounding area can be kept free from houses.

The destruction of a magazine by explosion is to determine the license. If two or more buildings in a factory are destroyed by explosion only one is to be re-erected in the place of the two or more so destroyed, unless by special permission of the Secretary of State, and then under such conditions as he may impose. All explosives during conveyance are to be duly labelled and declared, and none are to be carried in public vehicles or in passenger ships without permission of the Board of Trade.

Harbour authorities, railway and canal companies, to have power to frame bye-laws. Government Inspectors are to be appointed, such Inspectors to have power of entry and examination into all factories, shops, and magazines; and power to take samples, and to require railway companies to carry such samples. If the Inspector observes anything, in his opinion, unnecessarily dangerous and defective, he can require the same to be remedied forthwith, without question or appeal, and if the licensee feels himself aggrieved he may apply to the County Court for damages against the Inspector. All accidents to be reported to the Secretary of State, and an Inspector to attend at every inquest held by a coroner upon such accidents. Heavy penalties to be imposed for a substantial departure from any important condition of a license. Vested interests to be guarded as follows:—Occupiers of factories and magazines lawfully existing at the passing of the Act, to be entitled to obtain from the Secretary of State a continuing license without reference to the local authorities, but the Secretary of State to have power to impose conditions upon such continuing license. Any difference of opinion as to these conditions to be referred to arbitration. This Act is not to apply to factories or magazines belonging to the Crown, nor to the storehouses of volunteers, nor is it to interfere with the law of nuisance.

These, Sir, are the conditions proposed by Major Majendie as the basis of an Act of Parliament; they are in principle satisfactory, as equalising in some degree, though not sufficiently, the application of the law to all explosives.

They may be improved in some important details, which we will discuss upon consideration of Major Majendie's plans as described. In his evidence before the Committee as to the mode in which the Act should be carried out he instances several cases of almost culpable carelessness on the part of storekeepers and others having stores of gunpowder, and he conclusively proves, what I think all will admit, that these stores, whether belonging to manufacturers, miners, or retail tradesmen, do require supervision and control by an officer able to punish any infraction of the law. One case was mentioned of the door of a magazine being lined on the inside with iron to prevent the penetration of bullets from the rifles of the volunteers who used the door of this magazine for their practising target. Other cases almost as foolishly careless on the part of storekeepers were given, and many of these would, without doubt, cease if every dealer in explosives, as well as storekeeper, was obliged to take out a license, which would bring him under official and well-defined rules, under regular inspection at indefinite periods, and subject to penalties in case of a wilful infraction of the law. These common licenses it is proposed to grant as a matter of course to persons upon application to the authorities and upon payment of the nominal charge of one shilling, the term of duration of such license to be fixed by the licensing authority, who would be a local authority, but no license to remain in force for more than five years. Hitherto under existing Acts, places have been licensed under the new Act it is proposed that all licenses shall be personal. I very much object to leaving the power of granting licenses in the hands of the local authorities; doubtless many of your readers will think this would amount to a prohibition of licenses, and upon this point I think information is desirable. I would rather place the power in the hands of the Home Secretary, and even in the case of special licenses I would rather see the power vested in him than in the local authorities, and for the obvious reason that he can command the best technical knowledge of the necessary requirements in each case. The carriage of explosives is a point of paramount interest and importance—the railway companies, who have virtually obtained the monopoly of the carrying trade, frame the most arbitrary and vexatious rules under their bye-laws, the London and North-Western Railway Company being the worst offender, and even going the length of exclusion. One of these cases was instanced in the fact that some of the companies had declined to convey some very small samples of dynamite for the Government on account of its presumed danger; and this, notwithstanding that the Home Secretary had offered to give every railway in the United Kingdom a license under the Nitroglycerine Act to transport it in bulk for the use of the mining community, and in face of the fact that after the most careful and exhaustive examination by the railway goods managers' committee, assisted by such eminent scientific advisers as Dr. Letheby, Professor Bischof, and Dr. Odling, who have placed on the records printed and circulated by the Railway Clearing House that dynamite is safer than gunpowder under all conditions of transport, and with similar testimony from the War Office authorities, and with the further knowledge that thousands of tons of the material have been conveyed by rail in this country and on the Continent without a single accident ever having occurred. Take only the case of sporting cartridges, the railway companies have framed such rules and fixed such charges that very few parcels of cartridges are ever declared, although many hundreds of thousands of them are annually conveyed upon every railway in the kingdom, sometimes as fish, sometimes as wines and spirits, and sometimes as hardware goods

and so are carried without any of that ordinary care which they would receive were their character known, in fact the railway companies render it impossible for the trade to be carried on at all under their conditions, and a contraband trade has in consequence been created. I think it would only be right to compel railway companies to carry certain explosive goods at uniform rates, and some such division of classes as that sketched out by Major Majendie would be a fair division, and all goods in each class should be conveyed (if necessarily compulsorily) at equal rates.

He says:—Explosives to be divided into six classes—1. The gunpowder class.—2. The class to which may be given the name of nitro explosives.—3. The chlorides.—4. The fulminates.—5. The ammunition.—6. The fireworks.

1. The gunpowder class, consisting of gunpowder proper—the mechanical mixtures of nitrate with carbonaceous substances possessing explosive properties. Another class would include dynamite and all those chemical explosives which are produced by chemical action of nitric acid upon carbonaceous substances; these consist of two divisions. First there would be the nitroglycerine class. That would include nitroglycerine preparations, such as dynamite, lithofracteur, &c. Then would come the class which includes guncotton, gun-paper, gun-sawdust, cotton gunpowder, Schultz's powder, and so on. Then the chloride class would consist of any explosive preparation which contains chloride mixed with any form of carbon or carbonaceous substance. Brain's original blasting-powder would come under that head. Chlorated guncotton would also come within that class. These are substances of so highly sensitive a character as to require special regulations, and so they are placed in the fulminate class. The ammunition class would be a very comprehensive one, and would be divided into two parts. In the first would be all those articles which were not liable, or were very remotely liable to communicate explosion from the one to the other. For example, breech-loading cartridges, which are not liable to explode *en masse*, but of which one may be exploded among a great many without exploding any of the others, so that they should not be put into the same class as the Chassepot or skin cartridge, where the explosion of the one would communicate to the rest. Then there are the safety blasting fuses employed in mining operations, and which are not liable to cause explosion from one to the other. There are also railway fog signals and safety fuses for shells. The second division would include varieties of ammunition liable to explode, such as non-safety cartridges, detonating and non-safety fuses, war rockets, tubes for firing guns, &c.

You will see, Sir, by this division that the general principle is to recognise the difference of risks in different classes, and to determine that the treatment that shall be received shall be based upon the recognition of the explosive. This principle is a wise one to adopt in the regulation of manufactures, storage, and transport, and the railway companies should be compelled to adopt it, as well as Government, when dealing with such materials. Major Majendie also proposed that 30 lbs. of gunpowder if packed in canisters, or 20 lbs. if loose, or 10 lbs. of dynamite or guncotton, might be kept without any license. Personally I cannot see why the quantities of these might not be equalised, for whilst dynamite is much more powerful than powder when exploded by detonation, it is quite harmless in small quantities when inflamed, so that whilst you would have a considerable explosion with 20 lbs. of loose powder you would have none at all with 20 lbs. of dynamite or guncotton. In fact, my opinion is that these quantities should be increased to 50 lbs. in each case. It is proposed to abolish transport licenses, and this I consider to be a wise arrangement, as the maker and the storekeeper would each be licensed.

Now, touching the position of mine magazines, I stated in my letter last week that if the law were strictly enforced one-half of the magazines in the kingdom would be closed, and I am glad to see that it is proposed that the sites of magazines, their distances from houses, &c., should be determined in each case by the licensing authorities. All miners know that it is possible to have one magazine so situated as from the surrounding configuration of the ground, or by burrowing in the earth, or in a mine or colliery waste heap, to be thoroughly protected and practically free from danger to other buildings which may be near to it, whilst in other cases, where magazines are erected in the open upon level tracts of ground, the danger to other buildings at much longer distances from the scene of an explosion would be materially increased, so that it is impossible to draw a hard and fast line in this respect. I should also be glad to see large seaport towns like Liverpool, Glasgow, Hull, &c., with their public magazines, in which any person wishing to store for the purposes of shipment might be able to place any explosives under their respective classes.

I do not, Sir, intend to consider that part of the proposed Act which refers to the various manufactories. These details will interest but few of your readers, and manufacturers are generally able to look after their own interests. I would, however, say that I consider the proposed time for the license of existing manufactories—30 years—is very short, and would inflict hardship upon makers who had expended large sums upon their factories, and I would suggest that a term of 50 years, or even longer, might reasonably be substituted. I cannot agree with those manufacturers who exclaim against the compulsory inspection of factories and the adoption of proper rules; they say it is not needed in their interests, nor in the interests of the public, who never suffer from an explosion; but they make no mention of the workpeople, who are always the first and worst sufferers from any accident arising out of bad rules and regulations, or in some instances from no rules, and who never have the power to protect themselves in such case against their employers. The inspection of factories ought to be thoroughly effective and systematic, and the inspectors should have power to enforce their rules in the interest of the workpeople. In case of arbitrary interference on the part of an Inspector, it is proposed that the party aggrieved should have a remedy in the County Court; now, without suggesting any other course, I must say I consider the proposed remedy is absolutely illusory.

I cannot understand why Government manufactories and stores should be exempted from the operation of these Acts. Government gunpowder, which is stated to be more carefully made, will kill quite as effectively as that of private manufacturers, and the additional honour to be gained by being killed by an explosion in a building belonging to Government is not to my mind of sufficient value to warrant the exemption of these places from the operation of any just and moderate law such as that which it appears to me the authorities desire to effect by the equalisation of the law regulating all explosive materials. Q. E. D.

MINERS' PAY—THE THIRTEEN-MONTHS SYSTEM.

SIR,—Capt. Knapp's remarks on the question of pay do not contain anything new, but only what has been written over and over again. "Troon Institute" forgets what he is writing about; there is nothing in his last communication having any reference to miners' pay. Capt. Knapp can give us his experience; does he mean that men working under him do not get more for "five" weeks than for "four?" I should like much to see his method of making up a pay-sheet. I should think from the tenor of his letter that he inclines to the old system of 12 pay days, and I hope he will adhere to it, but I object myself to "five" weeks months without ample subsist.

The only practical settlement of the question yet put forward, in my opinion, is that in a letter some weeks since, signed "Simon," the question being as to how the monthly cost ought to be made up, and as he suggested that the miners should receive subsist to as near the amount due to them as practicable, surely miners as at present receiving good pay could then have no cause to grumble, the agents as well as smiths, carpenters, and monthly men receiving five weeks' pay for five weeks' work.

I should feel obliged to Capt. Knapp, or some manager who adopts the thirteen-months system, to state as to how they make up the cost (say) once a fortnight or once a month; do they keep any time in hand, or do they pay up on Saturday nights? I know that Captain Knapp does not, or will not, adopt such a system unless compelled. I have to find pay for more than one mine; some of the cash comes from London, some locally. If miners must be paid up on Saturday nights how can I send the pay-sheet to London for the exact sum required? Surely the miners are not such a set of men that they almost require to be paid in advance. Cannot they give credit for one week's wages? as they have no tools or stock in trade to provide for (even agricultural labourers have to find their own tools).

I will stick to the twelve-months pays, giving full subsist, and that when the accounts are audited the shareholders shall know what months such audit is for. Should the shareholders compel me to adopt the weekly, fortnighly, or "four-weeks" pay I will keep one week in hand, giving the miners to understand such at starting. Not having yet had any grumbling as so pay arrangement, I need not trouble about it, but I should like to see one system only of mine pay and accounts.—*May* 12, —— JOHNSTONE.

MINERS' PAY—THE THIRTEENTH-MONTHS SYSTEM.

SIR,—As an old subscriber, I have written once before on this subject, having taken a deep interest in it, and I cannot refrain from expressing my sympathy and admiration of Mr. R. Knapp's temperate and sensible letter in comparison with the letters signed "Troon Institute," which are inconsistent, and devoid of logical reasoning. The former takes the right view of the case when he states that miners should not labour under the five-weeks system for an entire week without remuneration, whilst at the same time to dispose of this by the creation of a thirteenth month is arbitary and unjust. The latter evades the point of issue by hypocritical questions in replying to the exhaustive letter of "Unit," April 4, which practically exposes the specious action of the thirteenth pay in the year by asking for arguments already ably given by him and others, and which remain both unanswered and unanswerable.

I endorse the views of "Unity," that the arguments advanced against this system by your articles and numerous correspondents are incontestible, and agree with them that the system is vicious in its operation, and as yet I have not seen a single argument in its favour to justify its continuance. The facts do not bear reflection, as the action of the thirteenth pay in the year condemns itself by the irregular dates at which the four-weeks accounts terminate under it. The principle, therefore, is fallacious, and would be much abused in time; I believe no right-minded agent approves of it; in fact, it opens the door wider for speculation, otherwise I am disposed to think it would not have a single advocate for maintaining a system—bringing up accounts at irregular dates. This is an evil which will, if persisted in, destroy confidence; therefore, if it is wanted, from proper motives, to pay workmen and miners at shorter dates, let then have some practical advantage by devising some plan for paying them weekly or fortnightly; but pay sheets should be closed at the same dates—monthly.

It is simply idle to suppose that it can make any practical difference to these men if at bargain work, or rated at so much per day, whether they are paid in 28 or 30 days; therefore, the persistency in upholding the thirteenth-pay in the year is suggestive of some hidden motives for securing unworthy advantages. If mining companies and adventurers united to resist a system fraught with bad consequences, they would probably save many properties from being ultimately stopped. It is bad enough to be continually meeting calls, to say nothing of unintelligible accounts.

London, May 14. —— E. C.

TRANSPORT WITHOUT BREAKING BULK ON MIXED-GAUGE RAILWAYS.

SIR,—Having been for some years connected with railways, and with persons interested in their development, I read with pleasure the article appearing in the *Mining Journal* of April 26, drawing attention to an invention by Mr. Walker, of Old-street, of a new system of railway communication, specially adapted for feeding trunk lines, and by the use of which the interior of large countries could be opened up at a comparatively small cost.

I have since inspected the models, and had the invention fully explained by the patentee, and must say that for simplicity, apparent durability, and cheapness of construction, it far surpasses anything of the kind that I have either seen or heard of before. Our Asiatic and colonial dependencies could not fail to be greatly benefited by the introduction of feeding lines on this principle, as by its aid the produce of the far interior could be easily and cheaply brought to the main lines, and by them conveyed to the shipping ports. For such a country as India, subject to seasons of drought, it would be invaluable; by it hundreds of tons of water could be brought from any distance, thereby removing the cause which periodically necessitates the expenditure of large sums of money to keep alive a starving population.

In the interests of commerce its benefits cannot be over estimated, produce of all kinds could be freely distributed or exported instead of rotting in the district where it is raised owing to lack of the means of transport. As is generally the case with an invention of this kind, Americans are the first to perceive its advantages, so that I am not surprised to learn on good authority that the first line on Mr. Walker's principle is likely to be laid on that Continent. It will be a source of regret to all who value our own prosperity if those gentlemen whose special duty it is to develope the resources of our dependencies fail to give to this admirable invention the attention and consideration it deserves. EXCELSIOR.

Lombard-street, May 15.

ELECTRIC LAMPS FOR LIGHTING MINES.

SIR,—Lighting mines by gas having been mentioned in the Prize Essays published in your valuable Journal, I should like to ascertain from your numerous scientific correspondents if electric lamps have ever been tried in lighting up metalliferous mines. There was an experimental lamp exhibited in London some years since by Messrs. Dumas and Benoit. Since electricity can now be generated cheaply perhaps it is not a stretch of the imagination to conceive that such an illumination might be brought into use for underground workings. Voltaic electricity would be too costly, the wear and tear of the batteries rendering it out of the question, and frictional electricity requiring too large a machine to produce sufficient power. Dynamic electricity must, therefore, be resorted to, and I would ask if the whole thing could not be arranged sufficiently compact in a case the size of an ordinary bucket, as it must be portable. I think no system of wires would answer the purpose. The magnesium light is said to give out less heat than gas, which is a desideratum, but I understand it gives off a dense vapour, which, of course, would preclude its use altogether. I have not heard of any experiment with this material, but am informed that magnesium cylinders and ribbon are manufactured at much less cost than formerly.

Any information on what has already been accomplished in this way, with its cost, compared with candles, lamps, or any other system of illumination, will be of interest to many readers.

J. T. R.

MR. N. ENNOR, ON CAMELFORD AND SIMON WARD AS NEW MINING DISTRICTS.

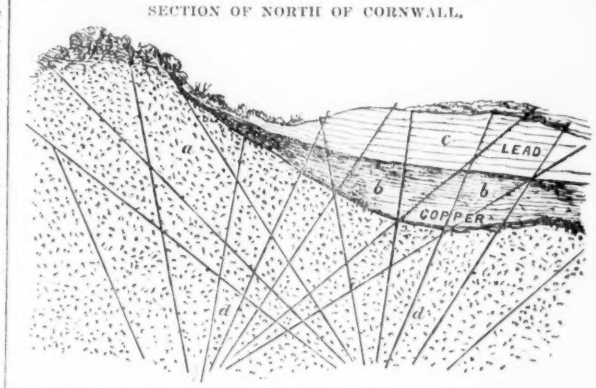
SIR,—Allow me to give you for insertion this as the third mining district. [These I give to draw mining men's attention to new mining districts; I do so for public good, I ask neither fee nor reward. With my name attached, I avoid writing twaddle.] This is the fourth time I have called attention to portions of this district. I say all the junctions of granite and killas in the north of Cornwall, east of Redruth, is untried ground. Scores of promising lodes are to be seen all but unbroken, then why not call on some of your anonymous "twaddle" writers to come out and show fair reasons why paying ores have not grown in this district, as they have in nearly all the other districts of Cornwall?

To show my views of these districts, I first notice the Indian Queen; I admit three or four lodes have been tried there, and they all show tin and copper, but not sufficient to pay; but that says but little against the district, when it is well known that even in the best districts of Cornwall and Devon the paying mines are only 1 in 20, and in Wales 1 in 50. Then, I say these districts have not had a fair trial until 30 mines have been fairly tried, and I will then follow this bit of junctions on to Bodmin, Brisbane, St. Neot, and Simonward.

I have before said, in my three gift reports, that many hundreds of tons of low-priced copper has been raised and sold from a mine near Simon Ward, and the mine is now untried, only opened on the lode for about 70 fms. in length. I say it was badly worked. After the mine was stoped a second lode was found, and is now to be seen not opened on above 5 or 6 fms. deep, with as fine a gossan as is to be seen in the country. These two lodes cross each other near the junction of granite and killas, where it is also crossed by a soft elvan. What better situation can be found to open and search for a mine in? From this point to Camelford there are a great many lodes, not even opened, that are to be seen in the granite and killas, at Trethin, near Camelford. They have two or three lodes, and a water-wheel; they have sunk a shaft 20 or 30 fms., and they found good lead and copper, but the proprietor, and, I believe, he was the landowner, died suddenly, and I think but little is now doing on the mine. This mine is in the killas formation. A few weeks ago I was at Camelford, when a person brought a trap, and almost insisted upon my going out with him to see a new lode, found about 200 fathoms east of the junction of granite and slate. The lode is large, and sunk on about 20 feet—a finer burrow of gossan than is thrown up I have not seen for years, with sulphur, mundic, and copper in it. This lode is opened on about 200 fms. east of Trethin estate, which is west of this opening.

Trethin Mine is about a-half mile further west still. I am not aware if this opening is on one of the Trethin lodes. The opening on this lode in granite was done by a Mr. Scott, of St. Austell. I noticed someone had been opening about 100 fms. west of Mr. Scott's opening, I think on an elvan course, they call it a china-stone lode. It was late, I could not examine it, but it is not unlikely to be an elvan course, and if it crosses the lodes they are sure to produce copper. I have not noticed half the lodes known to be in these districts, I am only calling attention to it as a new district. I think most of these lodes are to be worked by water. As I once levelled the ground, and I find the water is to be brought from Roughtor to Delabole Quarry, in that case it will work these mines. The granite does not extend far above Camelford, but it sweeps round to Bray Hill and Five Lanes. Then the ground north-east of Camelford, in the parish of Davidstow, and even to near Five Lanes, contains in large quantities good magnetic iron ore. I set all these districts down as fair speculations, as mines in new ground stand a far better chance than scores of old, badly-selected mines. Work with the idea of sinking deeper and you will find ore.

SECTION OF NORTH OF CORNWALL.



a. Granite; *b*. copper-bearing slate; *c*. Lead and zinc bearing slate; *d, d*. North and south lodes.

St. Teath, Camelford. —— N. ENNOR.

CORNISH MINING.

SIR,—In my last week's letter I stated that I should not be surprised to hear of a discovery in that part of West Gorland Mine called Messer's at any time. I am pleased to hear of the anticipated discovery of a lode worth 120*l.* per fathom going away westward in whole or unexplored ground; this is looked upon as a very important matter for the Gwennap district.

At Wheal Unity Wood they have reached a desirable point—the bottom of the old mine, which for this district is comparatively shallow, only 50 fathoms below adit; the tin lode here has been found left standing, which on stoping down proves to be worth 50*l.* per fathom; the engine-shaft will shortly be sunk on this lode, and it is highly probable that large discoveries of tin will be laid open, thus rewarding the perseverance of shareholders and agents. It may be said of this mine that the great bulk of dead work is about accomplished, and that henceforth they will be opening up new ground, and doubtless selling large quantities of tin; one great feature here and in West Gorland is that the managers and pursers are large holders, thus showing their confidence in the ultimate result. A few such discoveries as these will cause a great stir in the mining enterprise of the county, and from what I have lately seen the time is not far distant when we shall hear of further improvements and more discoveries, thus dispelling the cloud that has so long hung over the great mining interest of Cornwall. C. BAWDEN.

St. Day, Scorrier, Cornwall, May 15.

MINING IN DEVON AND CORNWALL

SIR,—Allow me, through your valuable Journal, to pass a few remarks respecting mining in the two western counties. I see by our daily papers that one of the mines on the banks of the Tamar, which has been reported on very favourably for years past, is now idle, on account of the obnoxious five-weeks system. However, I am glad to hear that the men have gone to work elsewhere. I cannot understand why a change cannot be made in the miners' pay in Devon and Cornwall now and 200 years ago. Everything else is having improvements, why not change the system of pay? The same capitalists, laying out their money in any other than the two western counties, pay their labourers every week or fortnight, but as soon as ever they come here they must have nine weeks credit from the labourer, and three months credit from the merchants. Many of the men do not get more than half the requisite quantity of food for months on account of it, and then, as a natural consequence, cannot do more than half the amount of work. All daymen should be paid fortnightly, and all others to have money when required, and be allowed to earn as much money in two weeks as they now earn in three, then you would find that there would be more work done in two weeks than there is now in three. See what a saving that would be; the same amount of work done in two thirds of the time, one third less coal, leather, oil, grease, &c., one-third less for engineers' wages, and, above all, one third less for management, which in a great many instances is enormous. Things conducted on this principle would soon bring mines that are now barely paying costs to be on the Dividend List. Another great evil is the want of better ventilation. There are hundreds of places in Devon and Cornwall, if properly ventilated, in which two men could do more work than six can at present. Another great mistake is that there is not attention enough paid to the leavings in most of our mines; it is too often worked for one thing only. One mine not 20 miles from here, worked for copper—low-priced ore, I admit—still it worked for nothing else for a great many years. After some time it worked for tin only, yet they were only stoping the same ground to raise their tin that was laid open and worked for copper a few months before. Where is the copper, there are no returns? One with his eyes open at these things would believe the managers to be blind in one eye and the directors to be blind in both.

Dr. Emmens, I believe, intends doing something different to what has ever been done before in this district, and I wish him every success. Although the process is new to the neighbourhood, it is not new to everyone. I met an old friend of mine a few days since who has had great experience in abstracting low percentage ores by chemicals, who says that with proper treatment he is sure it is going to be a success; and from such an authority I think there is no fear, if legitimately carried out. Then there is no doubt others will follow the example, as there are a great number of places in the West of England that are well worth the attention of the public. I shall give a few more interesting remarks in my next.

Callington, May 14. —— JOHN BUCKINGHAM.

THE DELABOLE DISTRICT.

SIR,—I observe a communication in the Supplement to last week's Journal from "W. S.," remarking more particularly on the North Delabole Slate Quarry Company (Limited), which I understand is now being brought out, and I infer from the general tenor of his remarks that this property has paid exceedingly good profits, and is capable of doing so provided that judicious management and the needful amount of capital are applied. In these times, when bubble schemes are so abundant, properties such as "W. S." represents this to be must be very desirable to investors. Inasmuch as those representations relative to the intrinsic value of the property are thoroughly borne out by all who know it, I do not question them. The writer states that the property "is more generally known in this district as the Bowithick Slate Quarry," from which I infer that it is on the property of Mr. Kekewich (son of the late Mr. Samuel Trehawke Kekewich, who was M.P. for South Devon), and who has property there by that name. OBSERVER.

ABERYSTWITH SILVER-LEAD MINING COMPANY.

SIR,—This mine, which is about 12 miles out of Aberystwith town, has been working for the last two years, carried on by a spirited party of London gentlemen. Buoyed up by their agents continually reporting favourably upon future success, they have gone on sinking and driving until they have got the mine 40 fms. deeper than any other mine for any distance of working; at all events they have 40 fms. of backs to stope away between the western or boundary shaft, into the Bwlch Gwyn part of the mine, to the eastern boundary, about a half mile, and at the present moment the lode seen in the eastern end in the bottom of the mine is worth from 4 tons to 6 tons to the fathom of rich silver-lead ore. Such a picture I have never seen before, although residing in this county for a number of years. It is driven about 12 fms. east of Penrhiw shaft, in Col. Powell's land. The western end, extending about the same distance, has also a very beautiful lode of spar, copper, and lead ore, worth, no doubt, fully 1 ton to the fathom, and judging from the levels above (some 50 fms.), where the tributers are at work, and are doing well, having the same appearance, in the bottom levels the lode is much larger. I meet

decidedly say it is the finest mine to be met with from its eastern sister, Van, even to the seaport of Aberystwith. There are other mines working upon the same lode, such as the West Esgair Lle, the Crown, the two Llwyn Teils, and away to the rich Ystumtean, into the beautiful valley of the River Rheidol. When the company first bought the mine it really looked very poor, nothing, scarcely, but sulphur throughout the lode; but by perseverance, and a miner's practical knowledge, they are now about to reap from what they have sown. 150 tons of silver-lead ore have been sold from the mine within the last 18 months. T. N.

Ponterwyd, May 14.

RUBY CONSOLIDATED MINING COMPANY.

SIR,—Allow me to correct the report of the meeting of this company, in last Saturday's Journal, as far so it affects me. I enquired whether Mr. Hartmont, one of the directors, and not Mr. "Altmann," had received a portion of the 1500*l.* appropriated by the directors as fees. Furthermore, I did not make the indecorous remark imputed to me—"The Lord Chief Justice of England, of Tichborne celebrity," and on this point the following is the accurate version:—When, in answer to my enquiry, Sir George Bowyer, M.P., at last admitted that a fee of 500*l.* was put to the credit of Mr. Hartmont, towards his (Mr. Hartmont's) unpaid calls, I certainly said that the Lord Chief Justice (omitting at the moment to say the Lord Chief Justice of England) had stamped such proceedings as a fraud, and upon Sir George Bowyer, M.P., nervously remarking, "What do you mean by the Lord Chief Justice?" I replied that if the recent *cause célèbre* of the Tichborne trial had not revealed to him the existence of the Lord Chief Justice of England, nothing could. I trust that you will be good enough to insert this corrected version in your next impression.—*Threadneedle-street, May* 13. MAXIMILIAN LOW.

RE SHELTON CLAY AND TIN MINING COMPANY (LIMITED).

SIR,—With reference to a second letter which was published in the Journal of Saturday, I regret much the two Dublin shareholders who write these letters, do not first enquire at the offices for any information. The only reply that I need make is that the statements made by me can easily be proved by our books, and the clerks who sent out the notices of meeting. Every shareholder has notice of every meeting. It is a great pity shareholders cannot be induced to attend the meetings when called. The shareholders that have attended the various meetings summoned by me were perfectly aware of the whole liquidation, and that my plan for re-forming the company, by which every shareholder would have saved his interest, was almost carried out, when proceedings taken by one of the creditors in the Stannaries Court caused the re-construction to be abandoned, and the property, after being extensively advertised, was sold to the highest bidder. The purchaser has, however, repeatedly offered to every old shareholder the same advantages, and most of them have availed themselves of the offer. FRED. WARWICK.

25, *Bucklersbury, London, May* 13.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

NATIONAL PROVINCIAL BANK OF ENGLAND.

The annual general meeting of the proprietors was held at the Bank, Bishopsgate-street, on Thursday,

Mr. R. BLANEY WADE in the chair.

The following is the directors' report:—

The directors have the pleasure of reporting that the business conducted by the bank, during the past year, has been followed by the most satisfactory results. Out of the realised profits they propose to add the sum of 50,000*l.* to the reserve fund, which will then amount to 600,000*l.*, and they recommend that in addition to the usual payment of 4 per cent. for the half-year, a bonus of 9 per cent. be paid, making the division for the year at the rate of 25 per cent. per annum.

It will be observed that the directors propose to appropriate 5000*l.* to the fund formed in 1871 for the relief of the distressed widows and orphan children of the officers of the establishment, a course which they feel confident will be approved by the proprietors. The amount hitherto annually distributed has been about 120*l.* from the existing fund, but it is confidently expected that the above grant, with the additional interest arising from the balance of the officers' guarantee fund, together with the voluntary contributions now being freely given to it by the officers, will form a sufficient sum annually to relieve such urgent cases of distress as may be brought before the directors.

After these payments, together with the usual bonus of 10 per cent. paid to the officers, the amount of undivided profits carried forward will be 50,004*l.* 0s. 7d., of which 45,369*l.* 17s. 10d. are derived from the accounts of 1872.

The profits thus proposed to be distributed are due not only to the steady progress of the bank in public estimation, and its general prosperity at all its branches, but likewise to the fact that the year was extremely favourable to banking operations. The trade of the country was prosperous, the demand for money very brisk; and notwithstanding the prevalence of high rates for money, and the numerous changes in the Bank of England rate, the failures, with few exceptions, were of an unimportant character, showing that trade in general had been conducted on a sound basis. The highest rate of the Bank of England was 9 per cent. and the lowest 3 per cent., and the average for the year was 4*l.* 15s. 9½d., being the highest since 1866. It is remarkable that 24 changes occurred in the rate, the greatest number hitherto recorded in any one year. Among the causes for so many changes may be mentioned the final adjustment of the French war indemnity, financial disturbances in Austria and America, an outflow of gold on German account, and a deficiency in our harvest, causing larger importations of grain than usual. The following is the summary of the operations for the year, submitted in the usual form:—

Rest or undivided profits at Dec. 31, 1872, as exhibited at the annual meeting in May, 1873	£669,400	0	0
Less bonus declared and paid in cash in July, 1873	104,400	0	0
	£565,000	0	0
And less amount carried to credit of building fund account	15,000	0	0
Leaving	£550,000	0	0
Net profits of 1873, after making allowance for bad and doubtful debts, and bonus to officers	397,135	2	9
Making	£947,135	2	9
Add undivided profits from 1872	45,368	17	10
Total	£992,504	0	7
Deduct dividend on co.'s stock, paid July, 1873	£ 54,000	0	0
ditto ditto Jan., 1874	54,000	0	0
Bonus of 8 per cent.	108,000	0	0
Undivided profits to next year	50,004	0	7 = £266,004	0	7
Leaving	£726,500	0	0
Out of these profits the directors propose to declare, in addition to the foregoing dividends and bonus paid to proprietors as above stated, a further bonus of 9 per cent. in July next, making a division of profits in 1873 in all of 25 per cent. upon the paid-up capital, free of income tax, amounting to	121,500	0	0
	£605,000	0	0
Less amount carried to the benevolent fund	5,000	0	0
Leaving reserve invested in Government securities	£600,000	0	0

Those proprietors who are conversant with the history of the establishment will remember that on four occasions the directors have deemed it expedient to exercise the powers with which they are entrusted, and to issue new shares. Since the last issue there has been an addition to the deposits of nearly 7,000,000*l.*, consequently the directors, acting upon the principle by which they have been hitherto guided—of enlarging the security afforded to the public in proportion as the business increases—consider that the time has arrived for a further increase of capital. They have, therefore, decided to make a further issue of 28,125 shares of 20*l.* each, to be offered at 10*l.* premium, payable by two equal instalments in July next and July, 1875, to the proprietors whose names shall stand upon the share register on May 23rd inst., in the following proportions:—

1.—Large Shares: One large to be entitled to ¾ new shares; two do., 1¼; three do., 2⅛; four do., 3½; five do., 4⅜; six do., 5¼; seven do., 6⅛; eight do., 7.

2.—Small Shares: One small share to be entitled to ¼ new share; two do., ½; three do., ¾; four do., 1.

Upon the new issue it is intended that 12*l.* should be called up in the following manner:—First instalment of 1*l.*, and premium of 5*l.*, making 6*l.*, to be paid on July 15 next; second instalment of 2*l.*, to be paid on Jan. 15, 1875; third instalment of 1*l.*, and premium of 5*l.*, to be paid on July 15, 1875; fourth ditto of 2*l.*, to be paid on Jan. 15, 1876; fifth ditto of 2*l.*, to be paid on July 15, 1876; sixth ditto of 2*l.*, to pe paid on Jan. 15, 1877; seventh ditto of 2*l.*, to be paid on July 15, 1877. Letters of allotment will be issued as soon as possible after the 21st., together with a memorandum for the fractional shares. The proprietors must either sell the fractional shares so allotted to them, or purchase such other fractional share or shares as will make one whole share, the memorandum for which must be lodged on or before Aug. 1 next, when scrip will be issued for the whole number of new shares given to each proprietor, and the operation be thus completed. Such instalment will be entitled only to the dividend payable in January next, after which date, however, it will carry dividend and bonus. The second and other instalment on shares will be dealt with in a similar manner to the first.

The directors propose to add the whole of the premium which will be received on these shares to the reserve fund, and to invest it as heretofore in Government securities. In the year 1877, therefore, the paid-up capital of the bank will amount to 1,687,500*l.*, and in 1875 the reserve fund to 881,250*l.*, consequently there is every prospect that before long it will reach the sum of one million. At the extraordinary meeting about to be held the directors will recommend that this society shall be registered as an unlimited company under the Companies Acts 1862 and 1867. The leading joint-stock banks in London, and many in the country, have recently been so registered. The chief advantages will be that while the principle of unlimited liability will remain unchanged, the liability of the executors of deceased partners and other retiring shareholders will be limited to one year, and that the property belonging to the bank will be held in its corporate capacity. The directors also recommend the proprietors at the said meeting to divide each of the original 100*l.* shares in the society, on which 42*l.* has been paid, into two shares of 50*l.* each, on each of which 21*l.* shall be taken to have been paid up, a measure which they believe will have the effect of more nearly equalising the proportionate value of the two classes of shares. The following directors go out of office by rotation, but, being eligible for re-election, offer themselves accordingly—Right Hon. Lord Ernest Augustus Charles B. Bruce, M.P., Henry Paull, Esq., Richard Blaney Wade, Esq.

The CHAIRMAN said: Gentlemen,—To-day we have rather more business to transact than we usually have at our annual meetings. I will, therefore, proceed to offer a very few remarks upon what we propose as to the distribution of profits for the year 1873. I need hardly tell you that the year, on the whole, was very satisfactory to the banking interests; the rate of money was high—as you will see by the report nearly 5 per cent.—and, consequently, our profits were considerable. This enabled us to propose to you in the month of July a bonus of 9 per cent., making, with the usual dividend and bonus previously paid to you, a distribution of 25 per cent. for the year. Now, gentlemen, satisfactory as this may be, I think it only right to point out to you and impress upon you that the year 1873 must be looked upon as an exceptionally good year for banking, and that we can hardly expect such a very high rate of money to reign every year as was the case in that year. We propose to add, with your permission, 50,000*l.* to the reserve fund, bringing the reserve fund up to 600,000*l.* I shall have something to say upon the reserve fund before I sit down. We next propose to appropriate 5000*l.* to the fund which you were good enough to allow us to inaugurate for the relief of the widows and orphans who are left in needy circumstances; and we feel, as I am sure you do, it is desirable that our officers, through their lifetime should, as far as possible, provide for those they leave behind them; but in such a very large staff as ours is there are cases which from time to time arise where it is almost impossible for them to make this provision; and we consequently have added to this fund, which, even small as it is, we have found of great use. We propose to add this 5000*l.* to the fund, and we believe and hope that, with the additions we shall receive from the voluntary subscriptions of our officers, an ample fund will be provided for these sad cases whenever they arise. I feel quite sure, that any act which we propose for the benefit of the staff will be cordially received by you. We all know how much we are indebted to the efforts of the staff; and it is always one of the most gratifying duties of the Chairman at this meeting to bear testimony to the admirable way in which these gentlemen perform their duties. Without saying too much of the staff, I think I may say with truth that there is no staff in this country which is superior to it, or possesses greater ability and energy, and who devotes their best services to our interests. (Cheers.) We propose, for reasons which will be obvious to you if you have read the report, to carry forward a sum of over 50,000*l.* to the next account. And now a word as to the progress of this great institution. Those who have watched our accounts from year to year will have been struck by the large increase which has been shown in the amount of liability—that is the deposits which the public leave with us; and on looking into this question we found that since the year 1870, when we brought before you the measure for the increase of the capital, since that period our liability to the public has increased over nearly seven millions of money. The result is this, we find ourselves now in exactly the same position as in 1870, as to the relative proportion between the paid-up capital and the liability to the public. We had to take this matter into our very serious consideration. It is quite true we might have postponed for two or three years any increase of the capital of the bank, but following the wise policy which has always been followed here, we felt it was our interest, as well as our duty, as regarded the paid-up capital and the reserve fund, to put the bank in a position ready to command the support of the public, and ready to undertake any business which may come to us. Therefore, after very mature deliberation, we decided upon an increase of capital, by the issue of 28,125 shares. These shares we propose to issue, as on a former occasion, at 10*l.* premium, which will be added to the reserve fund, which at the end of July in next year will amount to 881,250*l.* I am sure, looking at our liability, you will not consider that too much; in fact, I hope before many years are passed over we shall see our reserve fund standing at one million of money. (Cheers.) When the shares are paid up, you will observe by the report that we have made the process of paying up the shares as gradual as possible, but when the 12*l.* per share is paid the capital will be 1,687,500*l.*; and we think that will place the reserve fund and the paid-up capital of the bank in a highly satisfactory position, by which it will continue to command the confidence of the public. Before I sit down I must acknowledge, on the part of the board, the great assistance we have received from the joint general managers, Mr. Atkinson and Mr. Holt. No words of mine (and I say this with no exaggeration) can sufficiently express the assistance which those gentlemen gave us in our deliberations around this table; they bring an amount of energy and ability to bear upon the various transactions which come before them, which renders it a positive pleasure for us to work with them; long may they continue to perform the duties which hitherto they have performed so successfully. (Cheers.) In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. J. O. HANSON seconded the resolution.

A short discussion ensued on one or two minor points in the report, and several gentlemen expressed their satisfaction with the results of the last year's working.

The resolution for the adoption of the report was then put to the meeting and carried.

On the motion of the Hon. ELIOT THOMAS YORKE, seconded by Mr. ALEX. ROBERTSON, the retiring directors were re-elected—the Right Hon. Lord Ernest Augustus Charles B. Bruce, M.P., Mr. Henry Paull, and Mr. R. Blaney Wade.

Sir EMILIUS BAYLEY then proposed that the remuneration of the directors be raised from 8000*l.* to 10,000*l.* He reminded the shareholders that in 1870 the director's remuneration was raised from 5800*l.* to 8000*l.*, and it was then felt that it should have been 10,000*l.*, but it was agreed to let it stand at 8000*l.* Since that time the business of the bank, and, consequently, the labours of the board, had very largely increased, and he believed the shareholders generally would agree that the time was now come to raise the directors' remuneration to 10,000*l.*——Mr. CASTELLAN seconded the resolution.

One or two gentlemen expressed an opinion that notice should have been given to the shareholders, but after a short discussion the resolution for the increase of the directors' remuneration was put to the meeting and carried without a dissentient.

The meeting was then made special, and the directors were authorised to register the society as an unlimited company, under the Companies Acts, 1862 and 1867; the chief advantages will be that while the principle of unlimited liability will remain unchanged, the liability of the executors of deceased partners, and other retiring shareholders, will be limited to one year, and that the property belonging to the bank will be held in its corporate capacity.

A further resolution was also passed, dividing each of the original 100*l.* shares in the society, on which 42*l.* has been paid, into two shares of 50*l.* each, on each of which 21*l.* shall be taken to have been paid up. The directors believe that this will have the effect of more nearly equalising the proportionate value of the two classes of shares.

On the motion of Mr. REEVE, a cordial vote of thanks was passed to Mr. Atkinson and Mr. Holt, the joint general managers, to the other branch managers, and other officers of the company, for the able manner in which they had carried out their duties.

Mr. ATKINSON, in acknowledging the vote, said he fully endorsed, with all his heart, what the Chairman had said with respect to the branch managers and officers; it was impossible for any bank to have a more worthy or able body of men, or a body who devoted themselves more entirely to the interests of the bank. He could only say they were an honour to the establishment to which they belonged. (Cheers.) Having thanked the shareholders for the appropriation of the 5000*l.*, he briefly went on to refer to the important fact that the reserve fund would shortly be 1,000,000*l.*, and that the cash, or securities as good as cash, amounted to 9,500,000*l.* He fully concurred in the wisdom of issuing the new capital; and in conclusion, expressed his entire confidence in the future great prosperity of the company.

A vote of thanks was then passed to the Chairman and directors, and the meeting broke up.

GENERAL MINING ASSOCIATION.

A general meeting of shareholders was held at the offices, Old Broad-street, on Wednesday,—Colonel SCOVELL in the chair.

Mr. C. G. SWANN (the secretary) read the notice convening the meeting.

The report of the directors state that the accounts show a decided improvement over those of recent years, attributable chiefly to the more remunerative prices obtained for the coal. The sales from the Sydney Mines in previous years have included the coal used at the new winning (which until the completion of the work is charged to capital account), as such coal represents a considerable quantity it has been though better to give in the above statement only the coal sold to customers. It will be seen that the actual sales at Sydney were about the same as the previous year. The falling off of the Lingan sales, owing to the fire, was fully reported to the proprietors at the last half-yearly general meeting, and particulars will also be found in the report of the general manager. The expenses up to the end of the year, attendant on the accident have been written off the trading account of the mine, which still shows a small profit. The net profits for the year amount to 22,248*l.* 15s. 8d., of this sum an *ad interim* dividend of 5s. per share was paid to the proprietors on Dec. 10 last, absorbing with payment of Mr. Foord's pension, 6992*l.* 5s., which, including 637*l.* 13s. 3d., brought forward from last account, leaves a balance of profit and loss—

Amounting to				£15,894	3 11
Which the directors propose to deal with as follows:—					
Dividend 10s. per share	£13,734	10	0		
Mr. Foord's pension	125	0	0		
Reserve fund	1,500	0	0 =	15,359	10 0
Balance to carry forward to next account				£ 534	13 11

The resolutions passed at the extraordinary general meeting on May 24, 1872, reducing the capital of the association from 549,380*l.* to 274,690*l.*, and the nominal value of the shares from 20*l.* to 10*l.* each, having been confirmed by the Court of Chancery, the balance-sheet is now made up on the basis of that reduction. The shareholders will remember that by these resolutions the sum paid in redemption of the Duke of York's royalty, which had hitherto stood at its original amount of 45,831*l.* 7s., was written down to 23,705*l.* 17s. 6d., while an excess of capital amounting to 950*l.* 13s. 11d. was placed to a reserve fund. The former of these two items represented the then nominal value of the various mining areas leased to the association in 1858, including that belonging to the Albion Mines. The property having now been disposed of, the directors deem it prudent further to reduce the amount approximately in proportion to the value of that area, and to apply to that reduction the excess of the proceeds of the sale over the value at which the mines stood in the books the balance of the reserve fund above alluded to, after charging it with the sum of 1580*l.* 7s. 10d. applicable to the year 1872, together with the sum of 172*l.* 3s. 9d. charged to profit and loss for the past year, thus reducing the nominal value of the remaining areas to a round sum of 10,000*l.* From this it is proposed to write off 250*l.* per annum in further reduction thereof. The manner in which the reserve fund and Duke of York's royalty are thus treated will be clearly seen on referring to account "F."

The purchasers of the Albion Mines having duly paid the second instalment of the purchase money, the directors, without at present deciding upon the total amount that will ultimately be available for return to the shareholders, propose at once to distribute a sum at the rate of 20s. per share on capital account. The meeting will also be constituted an extraordinary one for authorising the distribution of this and of any further amount which the board may find themselves able to distribute out of moneys received from the same source. No further sales of any of the outlying portions of the property have been made, nor have the negociations alluded to at the last half-yearly meeting been as yet completed. But the directors are not without hopes of ultimately bringing them to a satisfactory conclusion.

The CHAIRMAN said the report and accounts showed that the anticipations he ventured upon at the last meeting had been very nearly realised. The sale at the Sydney Mine had been much about what it had been the previous year, but at Lingan Mine the production had been less, in consequence of the accident referred to at the last meeting. The increased price of coal, however, had enabled them to work to much greater advantage, the more particularly as they had been enabled to maintain the price to the close of the season; indeed, the Sydney Mine showed a larger balance than ever before, notwithstanding the increased cost of materials. The profit amounted to 20,000*l.*, and the Lingan Mine, in face of the decreased sales and increased expenditure, showed a balance on the right side. This enabled them to recommend a larger dividend than of late years, fulfilling the anticipations he held out at the meeting in November—10s. per share. (Hear, hear.) With regard to the operations he did not know that he could add anything to the explanations he gave at the last meeting, the more especially as since then had been almost a blank period, in consequence of the closing of the navigation during the winter months. The time, as usual, had been occupied in getting the machinery into perfect order, and with regard to the prospects of the ensuing season there was more than ordinary reason for being cautious in expressing an opinion. They all knew what was taking place with regard to coal in this country, the great reaction in price and fluctuations from day to day. Although a few shipments had been made at former prices the season could scarcely be said to have fairly opened, but it might naturally be supposed purchasers would take advantage of the reaction. A great deal would depend upon their competitors in meeting the demands of purchasers. As to the Lingan coal, which was a gas coal, the financial crisis in the United States was still operating to check the demand on the part of gas companies who had still stocks on hand, and who, no doubt, hoped by deferring purchases additional supplies would be obtained at lower prices. For this reason they had not sold so much gas coal as usual. He then moved that the report and accounts be received and adopted, and that a dividend of 10s. per share be declared (making with that paid in November 15s. per share) for the year 1873.——Mr. BISCHOFF seconded the proposition.

The CHAIRMAN, in reply to questions, stated that there had not been any strike, but the colliers' wages had been raised upon the understanding that with reduced prices for coal there should be a proportionate reduction in the wages.

The report and accounts were received and adopted.

Upon the proposition of Mr. BRIDGE, it was resolved that the directors' remuneration for 1869 (amounting to 775*l.*), which had been in abeyance, should now be voted.

Messrs. G. Scovell, A. Jones, and Col. Scovell were re-elected directors, and Mr. J. C. Ruding auditor.

An extraordinary general meeting was then held, for the purpose of considering and deciding as to the dividing rateably among the proprietors certain moneys arising from the sale of the Albion Mines, and as to reducing the capital of the association, and for coming to such special resolutions for the above-mentioned objects and for altering the regulations of the Deed of Settlement of the association with reference thereto, as the meeting shall approve.

The CHAIRMAN said the object of this meeting was to consider as to the disposal of the proceeds of the sale of the Albion Mine, sold at the beginning of last year. The directors had reason to suppose a very general expectation existed that a portion of these proceeds should be distributed among the shareholders; the directors felt that the disposal was a matter for the consideration and determination of the shareholders, and that they should be called upon to deliberate upon the matter with the directors, and share with them the responsibity, if any, of such a proceeding. They had, therefore, to consider its practicability, its expediency, and if expedient to what extent. As to its legality, they had to consider whether if such a step, being a return of capital, would involve the association or its shareholders in any further legal responsibility or liability, in the shape either of a return of that capital or a demand of creditors hereafter. Upon consulting their legal adviser, he (the Chairman) thought the difficulty had been overcome by the series of resolutions that had been prepared. As to its expediency, and to what extent, the directors admitted there was no prospect of any immediate application of the whole of the 150,000*l.*, and, therefore, if it were decided to allow it to remain in their hands for future exigencies it would have to be invested in such way as the Articles of Association would admit. The question, he thought, should be determined as to what was likely to be the future demands upon the capital. There was a claim that must some day or other crop up. They were in possession of leases of very extensive mineral areas at present totally unproductive; these leases, held from the Crown, expire in 12 years hence, but renewable for three periods of 20 years each, conditionally upon the association working them at the time. If the properties were not worked the leases lapsed. Negociations had been pending for the disposal of one portion of them, and there were still hopes that some of these unworked areas might be sold, the delay having arisen from the financial crisis in the United States. It might become a question whether, in order to retain these leases, money should not be expended upon them, and for that purpose whether a certain amount of capital should be kept in hand, or whether they should trust to the chapter of accidents, and leave it to the directors between now and 1886 to find the means to open these properties and retain them. The Lingan Mine had certain drawbacks, and a difficult shipping place, and a scheme had been brought before the board which would very much improve it: it would involve an outlay of 40,000*l.* to 50,000*l.*, but it was not contemplated to incur that expenditure. There were remaining of the debentures 13,600*l.* The shareholders were asked to defer their decision as to the ultimate amount to be distributed if they admitted the principle. There had always been great difficulty from want of working capital, especially in the winter season, and the directors suggested that to meet that necessity the sum of 25,000*l.* should be set aside. That would leave 25,000*l.* for distribution, and the directors proposed to postpone till next year any decision as to the final amount to be distributed, and in the meantime to limit the amount to 20s. per share, which would absorb 27,8l6. He then proposed a resolution to that effect.——Mr. BISCHOFF seconded it.

Mr. BIRCHAM (the solicitor) explained that there was no difficulty at all in making the return proposed. He was perfectly satisfied if the series of resolutions he had prepared were passed as special resolutions, and confirmed at a subsequent meeting, the shareholders would be acting quite right——Mr. RUDING supported the resolutions.

After some discussion it was put and carried unanimously, and other resolutions of a formal character were passed.

A vote of thanks to the Chairman and directors closed the proceedings.

GLYNGWILLIM COLLIERY COMPANY.

A general meeting of shareholders was held at the offices, Lothbury, on Thursday,—Mr. R. W. BILLINGS in the chair.

The SECRETARY read the notice convening the meeting.

The report of the directors congratulated the shareholders on the satisfactory progress that had been made, notwithstanding the delays and consequent increased present expenditure on the construction of the tramway, owing to the inability of the proprietors of Hughes's patent tramway to carry out their arrangements. The communication between the colliery and the main line of railway is now complete, and the main level has been considerably extended in the coal, so that sales can be made as soon as the necessary plant is fixed on the ground. The directors fully concur in the recommendations of their engineer as to the great desirability of at once providing the necessary capital for the erection of colliers' cottages, and for an extensive development of the underground workings, to enable them to make a large return, and consequent dividends to shareholders, and would strongly recommend the unallotted portion of the first issue of 20,000*l.* of the company's capital. The subscribed capital of the company will then be the amount originally contemplated, and will only be a small one to pay dividends upon. The condition of the colliery is such as to warrant the anticipation of complete success, such being contingent only upon a spirited conduct of development, and not in any way a matter of conjecture.

The report of the engineer (Capt. Kitto) suggested the advisability of pushing on the works at once, so that they may be able to produce a large quantity of coal, and take advantage of any favourable fluctations in the market; and, therefore, it would be well if more capital were at once expended upon dead work and in providing additional plant, so that no risk of a "hitch" or hindrance from this want may by any possibility arise.

The CHAIRMAN said that the operations he had foreshadowed had been a little interfered with, but, upon the whole, he did not know they had any reason to regret the change, although it had been one that considerably inconvenienced them for the time, because it had altered the whole position of the company's capital account. They were under an engagement to pay a rental to the Hughes' Patent Tramway Company, who were to construct a tramway from the colliery to the Great Western system, and find all the plant for working, but when he came to push matters closely he found the parties were unable to carry out their engagement, and the consequence was they had been obliged to take the matter in their own hands, which they did heartily, and carried it through successfully. They had now their own tramway and their own plant, and he thought Captain Kitto, who was present, would tell them they would be able to pay the shareholders an interim dividend in the course of the next six months, and a good one about this time next year. They were upon the coal, and developing it from day to day of better quality; indeed, they now considered they were really in a position to begin active and remunerative operations. All that was wanted was for the shareholders to help the directors by coming forward and contributing to the remainder of the unallotted portion of the first issue of capital. That was necessary to pay off outstanding engagements, and to place the colliery into a condition of immediate profit. The directors were fully aware of the value of the property, and he was quite prepared to take up more than his proportion of the unissued capital, which was the best evidence he could give as to the *bona fide* character of his opinion. The company was in a sound position, and with this comparatively small amount of capital there was nothing to mar the permanent success of the company. All that was required, and they believed it would be perfectly ample, was, in round numbers, about 5000*l.*, making, with the amount already issued, 20,000*l.* As he had already said, with that additional amount they would be in a condition to place the shareholders at once at a point from which

dividends could be dated. All the works had been done well and soundly. The first part was conducted under his own personal supervision, and since then Capt. Kitto's exertions had been redoubled; in fact, it was due to Capt. Kitto to say that he had brought the property into its present satisfactory condition. Besides clearing off the remaining claims upon the tramway it was proposed to erect workmen's cottages, and there were other matters which would pretty well absorb the capital, then they would be in a position to work profitably with only one-half the nominal capital, and he thought that all would say they had done remarkably well. He then moved that the report and balance-sheet be received and adopted.

Mr. BEDFORD seconded the proposition. He stated that they had their colliery, their railway, and their levels open, and all they now wanted was to bring down the coal and dispose of it; and he had every confidence that the profit realised would be very much larger than anticipated. He had a very large interest in the company as a shareholder, but as the landlord it was to his interest that the colliery should be worked in the most economical manner, and to the greatest extent possible. As a shareholder it was his interest that a large quantity of coal should be worked out so as to receive dividends upon the capital invested, and at the same time worked as advantageously as possible. With regard to the increase of capital their Chairman had already informed them that had it not been for the failure of the original contractors, who proposed to make the tramway and charge a rental for it, the company would have ample capital for all purposes, but he considered that they were now in a much better position, for they would not have to pay the heavy tonnage for carrying their coal over someone else's tramway; the line was their own, as was also the plant to be used upon it, and they had no rent to pay. There was no doubt that henceforth the steam coal trade would be very much more advantageous than it had been hitherto. In London people were accustomed to watch in the daily papers the rise and fall in the price of house coal, but shareholders in such properties should not be influenced by them, as there was very little variation in the price of steam coal compared with house coal. As soon as the labour question was settled there was every reason to believe that the ironworks in South Wales would be actively at work as well as the tin-plate works, which would stimulate the production of steam coal. When at the colliery, some three weeks since, accompanied by Capt. Kitto, he was much struck and pleased with the progress that had been made since his visit, some six weeks previously. When underground he broke some pieces of coal (now on the table) from the extreme end of the level; anyone acquainted with the character of the district would see that they had been taken from a place near a "fault." It had always been known that there was a "fault," and as soon as they got beyond it they would have a very superior class of coal, which had been proved in a large colliery in active operation. On that side of the fault the company had 1000 acres, and if such a colliery did not pay very handsome dividends he did not see how any colliery could. It was most desirable that the underground workings should be developed to the utmost extent, as thereby a larger output could be obtained at a proportionately smaller rate, but to do this it was necessary they should have a little more capital. It was never contemplated to issue more than one-half the nominal capital—20,000*l.*, and that amount would be amply sufficient for all purposes. Having handed in an application for 50 shares, he stated that he was quite satisfied from the correspondence he had had from several shareholders that there would be no difficulty in getting all the capital required. He had omitted to mention that close to their upper level there was a very good stream of water, which could be made available for working the colliery, or for some outside machinery, and some little distance above the level there was a large tract of land, containing an excellent slab quarry of Pennant rock. For about 250*l.* a very successful quarry could be obtained; a railway runs direct through it, and they had the right to use it; this alone might prove a source of very great profit by-and-bye, either by working it themselves or letting it at per rental.

The CHAIRMAN, in reply to a question, stated that the tramway had cost about 2000*l.*, of which amount 1600*l.* appeared in the balance-sheet; and, in reply to further questions, he (the Chairman) stated that it was proposed in the first instance to erect six cottages upon the colliery, and increase the number from time to time.

Mr. ATKINSON enquired what quantity of coal it was expected they would raise?

Capt. KITTO said that would depend upon the extent of ground opened and the length of the facing they had to work upon. He should say that in the course of some four or six months they ought to be raising 500 tons per week, if the shareholders would subscribe sufficient capital to open out the works properly; they could then raise a large quantity of coal; but if the operations were limited the output would, of course, be reduced in like proportion. There was no doubt whatever but that there was a very considerable quantity of coals, and that the colliery only required to be opened out to make it profitable; but that could not be done if the shareholders did not come forward and subscribe the necessary capital.

Mr. ATKINSON enquired what was the assumed life of a colliery?——Capt. KITTO said it could not be exhausted during the life of the present shareholders.

The CHAIRMAN said it was supposed the property contained nearer 4,000,000 than 3,000,000 tons of coal. The property was in the heart of a very important district, and well situated for bringing the coal to market. He added that he was quite prepared to take more than his proportion of the additional capital, and he knew that the other members of the board were prepared to take their full quota.

A SHAREHOLDER asked if there was any probability of the shares being offered at a discount?——The CHAIRMAN said there was not, except that the directors might be induced to allow a discount of 5 per cent. upon such shares as were paid up in full.

The motion adopting the reports and accounts was put and carried unanimously.

Upon the proposition of Col. MORTIMER, seconded by Mr. NELSON, the re-election of Mr. H. W. Billings as director was unanimously agreed to.

Col. Mortimer, Capt. Clark, and Mr. Bedford were also re elected directors. Mr. Wyon was also re-appointed auditor.

A vote of thanks to the Chairman and directors closed the proceedings.

ST. STEPHEN'S TIN AND COPPER MINING COMPANY.

A general meeting of shareholders was held at the offices, Crosby House, on Thursday,—Colonel FLUDYER in the chair.

Mr. W. WARD (secretary) read the notice convening the meeting.

The accounts, made up to May 2, were passed.

The following reports were submitted:—

May 14.—The directors have much pleasure in meeting the shareholders at this first annual general meeting of the company, and in laying before them a report on the prospects and conditions of the mines, together with a balance-sheet showing the financial position of the company up to May 2. From the agent's report it will be seen the large amount of work that has been done since operations were commenced about this time last year, and this work has been done in the best possible manner, and has placed the property in a position to make monthly returns of tin. The directors have to regret the vexatious delays which from long continued bad weather and other unforeseen circumstances have occurred to retard the various operations on the mines; but it is well known to all who are conversant with such matters, that these delays are almost, if not wholly unavoidable, and can only be viewed as incidental to large undertakings of this nature. The one circumstance which is now, and for some time has, been delaying the stamping is the inadequacy of the water for dressing purposes, but Capt. Nicholls is taking energetic measures to secure a full supply, so that he will soon be able to keep the whole of the 48 heads of stamps in regular work, when it is estimated they will stamp 50 tons of rough ore daily. The richest part of the property at present known is the Strawberry sett. The drivages in the 20, 30, and 40 fm. levels have turned out quite equal to expectation, and large reserves of tin ore have been laid open, and from the improved yield of the lode in depth the agents are of opinion that great riches will be found within 20 or 30 fms. below adit. The directors are convinced the mines are fully equal to the expectations which have been entertained regarding them, and that the shareholders will soon be satisfied with the returns. With regard to the financial position of the company, the directors are enabled to state, and the balance-sheet annexed will bear out the fact, that all costs, charges, and bills due up to May 1 have been paid. The balance in the banks is now 485*l.* 13*s.* 6*d.*, and there is still 260*l.* balance of calls due on the 24th inst., in addition to which there are 5500 shares to issue. The directors cannot conclude their report without expressing their thanks to Capt. John Nicholls for the able manner in which he has conducted the management and has carried out the various operations.

May 11.—I beg to hand you the following as my report of work done during the twelve months.—Dowgas: Engine-shaft has been cleared and timbered 66 fms., and pitwork fixed, Trevanion's shaft collared up, and Rhodes shaft cleared and timbered 50 fms. Deep adit cleared and secured 500 fms., which has given us easy access to the different lodes. Wood Head lode and the copper lode have been worked on in places above the adit, and present indications for producing mineral in paying quantities at greater depths. The Goffan lode is a series of carbonas, which evidently has yielded large quantities of mineral above adit, and at deeper levels will, no doubt, be found very rich in places. Very little has been done in this part of the mine below adit, but attention will now be given at the 18 to cross-cutting north to the copper lode, and driving east and west from the cross-cut to prove the carbonas.—Strawberry: The shaft has been enlarged and timbered 33 fms. 1 ft. 6 in., and sunk 5 fms. 5 ft. 4 in., making its depth 39 fms. 0 ft. 10 in. from surface. At the 20 fm. level 47 fms. 1 ft. of cross-cuts and levels have been driven, which have laid open considerable quantities of fair quality tinstuff. At the 30 fm. level 42 fms. 1 ft. 2 in. of cross-cut and levels have been driven, which have also opened out considerable reserves of good tin ground, and at the 40 fm. level 31 fms. 5 ft. of level have been driven. Some good tin ground is being laid open, and as this end is getting under the most productive ground in the 30, we are expecting a great improvement here shortly. We shall push on this level to communicate with Strawberry shaft, which we hope to accomplish in three months, and during this time attention should be given to erecting pumping appliances, in order to drain the mine deeper, and judging from the strong appearance of the lodes, together with their increasing productiveness in depth, there is every reason to expect a rich mine in a few fathoms sinking. At surface, engine and boiler houses have been built, agent's house, office, workshops, &c., put in proper order, and the following machinery erected—50 inch cylinder engine for pumping, 24 ditto for stamping, with 48 heads of stamps complete, 12 ditto engine for winding, and 8½ ditto for working stone-breaker, calciner, buddles, and other dressing appliances. To commence with for a short time we had sufficient water for 32 heads, but it has fallen off very much, and to remedy this we have fixed pump to lift grate water over again, and we are busily engaged clearing shallow adit to bring in a good stream from the valley, which will be completed shortly, and this will ensure a continuous supply, and enable us to keep the 48 heads going, which we can supply with fair quality tinstuff, and our returns will be satisfactory. We have commenced cleaning tin, and in a month's time we shall have a good parcel to sell. In conclusion, I feel pleasure in stating that but very few mines have developed so rapidly, and such a satisfactory position attained within the first year of working. Number of hands employed:—Underground, 106; at surface, 73: total, 179.—J. NICHOLLS.

May 13.—As you will no doubt have been furnished with a full and detailed report of the present operations and future prospects of these properties by your worthy manager, it would be unnecessary, and a waste of your valuable time, to go over the same ground. I will, therefore, give you as briefly as I can the result of my inspection, both underground and at surface. Dowgas shafts and adits, very difficult jobs, have been very satisfactorily accomplished. There is a cross-cut being driven by four men south in the deep adit level, to intersect lodes and elvan courses known to be adjacent to this point. Your agent purposes putting out a cross-cut north in the 18, under adit, to prove the copper lode, and also to drive east and west in the same level, to prove the carbonas or the Goffan lode. Strawberry shaft has been made good for 39 fms., and is capable of doing a large amount of work. A good length of tin ground has been laid open in the 20 fathom level, where a large quantity of tinstuff is ready to be taken away. The 30 has also opened out well for a good length, and continues to open out better. One stope in this level shows the lode to be 24 ft. wide. Whilst at this stage of my inspection, and accompanied by your manager, Capt. Nicholls, I was anxious to get some idea of the average value of this huge lode. I broke from the face of it, at spaces 2 feet apart, promiscuously, twelve samples, and had the same tried carefully for tin by Capt. Job, in the presence of your manager, Capt. Nicholls. The produce was at the rate of 112 lbs. of tin to the ton of stuff. It is possible I may have hit upon richer spots than the average will produce, but I assure you I made no choice of places when breaking the twelve samples. Capt. Nicholls estimates the average value at 35 lbs. of tin to the ton of stuff, and from the foregoing fact you may be sure that he does not exaggerate in his estimates of the various points of merit throughout the property. The 40 is getting nearly under this point, and great improvement is looked forward to. Already a considerable length of profitable tin ground is laid open, which the agents do not intend touching until this level is communicated with the principal shaft, having plenty of good quality stuff for 48 heads of stamps in the 20 and 30 fm. levels. Hitherto the water for dressing has been very little, but this difficulty is being got over, by appliances being erected to lift the water over again, and an adit is in a forward state, and will be finished in about a fortnight. This will be a great boon, as there will be then an abundant supply of pure water for condensing and dressing purposes. The Orchard property is intact, there being no operations going forward here at present.

Summary of underground work done since last meeting till May 5, 1874. Figures from the manager's books:—Dowgas engine-shaft cleared and timbered 66 fms.; Trevanion's, 50 fms.; Rhodes's, 50 fms.; deep adit, 500 fms.; shallow adit, 300 fms.; cross cut driven at deep adit, 7 fms. 2 ft.; cross-cut driven at shallow adit, 9 fms. 4 ft. 3 in.; level ditto, 8 fms. 5 ft. 6 in.; 18 fm. level cleared 46 fms.; Strawberry shaft enlarged and timbered 33 fms. 1 ft. 6 in.; ditto sunk, 5 fms. 5 ft. 4 in.; crosscuts and levels driven in the 20, 47 fms. 1 ft.; ditto cleared in the 30, 40 fms.; ditto driven in the 30, 42 fms. 1 ft. 2 in.; ditto driven in the 40, 31 fms. 5 ft.

Surface work and erections: The surface operations since my visit this time last year to this mine show an immense amount of energy on the part of the managing agent and his staff. Engine-houses erected and repaired, a 50 and 24 in. engines fixed in the former, with 12-in. pitwork, &c., most substantially fitted, and shaft cased and protected against accidents for many years to come, with ladder-ways the most comfortable I have ever descended; and the same remark is applicable to all the shafts in the mines. The 50, or pumping engine, works most satisfactorily. The stamping engine, with 48 heads attached, also works admirably, and is capable of driving double the number of stamps. The floors, with eleven large round buddles complete, with self-acting gears, and accommodation for numbers more, is a most interesting sight to look at. The drawing-engine likewise works admirably, and the Blake's stone-breaker, to which a permanent engine is at the present time being fixed, is so placed as to conveniently admit of the stuff being trammed into the passes for stamping, thus effecting a great saving of time and labour costs. There is a plentiful supply of dressing appliances, and, in fact, every accommodation to send 25 to 30 tons per month to market if the calciner be found capable of doing its work. But I believe there has not been sufficient time since its erection to say what quantity of tin it will accomplish.—J. J. LYNCH.

Mr. L. WRAY proposed that the report and accounts be received and adopted.

Mr. CRUMP seconded the proposition, which was put and carried.

Mr. Crump was re-elected director, and Mr. Edwards auditor.

The CHAIRMAN proposed that the best thanks of the shareholders be given to Capt. Nicholls, the manager, for the skill and energy displayed in bringing the mine into its present satisfactory position. He (the Chairman) had visited the property several times, and the progress made was truly surprising. When he (the Chairman) was at the mine 12 months since there was nothing but a barren common, but now everything presented a scene of activity. He was sure no company could be served better.——Mr. C. WRAY seconded the proposition.

Mr. WRAY had much pleasure in bearing concurrent testimony to the efficient services rendered by their manager—indeed, all practical men who had visited the property expressed but one opinion, that they had never seen works carried out with such energy, or in such an efficient manner. The buddles had proved a great success, the tinstuff passing through them being entirely denuded of its tin, and every other detail was most perfect. He most heartily supported the proposition.

Mr. LYNCH unhesitatingly assured the shareholders that in Capt. Nicholls they had a most valuable manager. As he (Mr. Lynch) had stated in his report everything was being satisfactorily and economically carried out. He could not help being surprised at the amount of work done since his visit last year; nothing could be more perfectly done. The shafts were perfect models, and the dressing apparatus could not be more complete, allowing comparatively no waste whatever.

The motion was carried unanimously.

Capt. NICHOLLS returned thanks for this renewed expression of confidence, and assured the shareholders he would continue to do his best to sink the mine to the best possible advantage.

A vote of thanks to the Chairman closed the proceedings.

WHEAL COATES MINING COMPANY.

At the second annual meeting of shareholders, held at the offices of the company in London, the Hon. ASHLEY G. J. PONSONBY presiding; the retiring directors, the Hon. Ashley G. J. Ponsonby, Messrs. Henry Ritchie, and Thomas Holroyd were re-elected, and Messrs. Deloittee, Dever, and Co., were re-elected auditors. The Chairman and directors received a unanimous vote of thanks for their gratuitous services during the past year, and the accounts and reports were received and adopted. The accounts showed an expenditure during the year of 4962*l.*, and a total expenditure from the formation of the company of 12,204*l.*: 2150*l.* worth of tin had been raised and sold.

Mr. WILLIAM BATTYE (the secretary) stated that the mine was opened sufficiently for regular returns of tin to be made. The engine-shaft being in perfect order to the 20 fathom level (or 45 fathoms from the surface), a cross-cut driven to the lode, which is a productive one for tin, the same shaft being continued 4½ fathom below the 20 to reach the course of ore at the 30, where there was every reason to believe an equally productive course of ore would be found. Levels east and west at the 10 and 20 had also been driven on a lode about 20 feet wide, producing good paying work for tin ore. Since this lode had been met with all operations, with the exception of the engine-shaft, had been carried on in tin ground. It was stated that the directors had believed that at this meeting they would of had the pleasure of announcing that handsome profits were being made, but the continuous drop in the price of tin during the past twelve months had completely, for the present, marred these calculations. The monthly sales would now be regular, and on reaching the 30 fathom level a large increase in the returns was expected.

Capt. MARTIN (the manager) stated in the course of his report what work had been done during the past twelve months, and said—"At the 20 we have cut winze plat, and fixed a large stull 20 ft. wide for penthouse, preparatory to sinking below. On Monday last we commenced to sink below this level, lode worth 12*l.* per fm.: the lode here for the full width is worth 30*l.* per fathom. Here we expect to open up rich tin ground from the droppers and branches seen in the cross cut dropping towards the lode, and we expect the lode to improve as depth is attained. For the next two or three months I should recommend you to raise only from 4 to 5 tons per month, at a cost, as shown in the estimate; but, if desired, we can raise the 6 tons of tin per month, but not with the same advantage as to profit until the levels are extended. I am pleased to say the yield of tin is equal to any of our former reports, all the ground driven and stoped at the 20 has produced 26 lbs. of tin to the ton of stuff.

GREEN HURTH LEAD MINING COMPANY.—At a meeting of the directors, held on Tuesday, a dividend of 4*s.* per share was declared, payable on the 30th inst. The mine is proving rich in the hazle beds, plate, &c., below the "scar limestone;" and between it and the "brigg limestone," lying below. One working is now worth 10 tons of ore per fathom.

EAST POOL.—At the two-monthly meeting, on Monday (Mr. Dennis in the chair), the accounts presented showed:—To labour costs, 2940*l.*; merchants' bills, 1541*l.*; lords' dues, 1-30th, 153*l.*: total costs, 4634*l.* Copper ore sold, 1050*l.*; tin, 3139*l.*; arsenic, 300*l.*; bismuth, 68*l.*; wolfram, 44*l.*; cobalt, 12*l.*; tungsate of soda, 1*l.*; (J. Jewell and others) burning, 28*l.*; income tax on dues, 2*l.*: total credits, 6644*l.*—showing a profit on the two months' working of 10*l.*, which, deducted from the balance against the adventurers at the last account of 103*l.*, leaves a present debit balance of 93*l.* The Chairman referred in detail to the greatly improved position of the mine, showing that a very large amount of good ground was being laid open, and would shortly be available for increasing the returns. Mr. Broad read the conditions of agreement entered into by arbitration respecting the water question with the Wheal Agar Company. Mr. Harris said he thought the arrangement was very equitable, and would be of mutual benefit. The award of the arbitrators was received and adopted, the general impression being that the prospects of Wheal Agar would be considerably enhanced, and that East Pool Company would be enabled to greatly increase their returns. With a further advance in the price of tin and a progressive reduction in coal and other materials, the committee looked forward with confidence to a resumption of dividends at no remote date. A vote of thanks to the Chairman, coupled with the special thanks of the meeting to Mr. Woolcock for the interest he had taken in promoting the settlement of the water question, terminated the proceedings. The report of the manager and agents, Captains Garby, Hosking, and Maynard, is exceedingly good.

WICKLOW COPPER MINING COMPANY.—The adjourned half-yearly meeting was held in Dublin, on Thursday (Dr. Percival Wright in the chair), and the auditors' report, for which the meeting had been adjourned, was submitted, and the adoption of the report and accounts was agreed to, the Chairman remarking that the directors were prepared to follow the suggestions of the auditors with regard to the mode of keeping the accounts. The meeting rejected the motion of Mr. Cummins that stocks of ore in hand and derivable under contract at date of closing accounts be passed to credit of profit and loss account. The Chairman believed that before the next half-yearly meeting the Arklow Chemical Works would be sold and erased from the company's accounts. It was resolved that the working and realisation of the Arklow Chemical Works, and the material, on hand therein, be kept a separate account, and not included in the half-years working of the mine, or in the profit and loss accounts of the company. The meeting rejected Mr. Flavelle's motion to reduce the directors' remuneration to 300*l.* until payment of dividends. Thanks were voted to the auditors, and it was resolved that in future they receive 20 guineas for each audit.

[For remainder of Meetings see to-day's Journal.]

UTILISATION OF BLAST-FURNACE SLAG.—In connection with this subject, which is now attracting much attention here in England, we would allude to the extremely simple method for disintegrating the slag into the form of sand, employed at the Seissin Ironworks, near Liege, which was shown to the members of the Iron and Steel Institute on the occasion of the meeting in Belgium. No machinery whatever is employed in the operation, which is merely effected by so placing a small water pipe below the slag run off the blast furnace, that the molten slag, as it pours down, is met by the rush of water from behind, and at once broken up into the condition of a coarse sand, which falls into a sump in front, from which it is lifted up by ordinary chain buckets and loaded into the railway wagons. Considering the complicated machinery which has been devised in this country for effecting the same object, it is quite refreshing to see how perfectly this simple and cheap process does its work. In the Vienna Exhibition samples of the so-called slag wool, and its application to coating steam-pipes, boilers, &c., as a non-conducting cover were shown, and appeared excellent in its way. It is formed by blowing steam against or through the liquid slag as it issues from the blast-furnace, and has very much the appearance and texture of dirty coarse sheep's wool.—*Iron and Steel Institute Journal.*

Lectures at the Royal School of Mines.

ON THE PHENOMENA OF LIFE AS MOTION AND CONSCIOUSNESS.

Prof. HUXLEY delivered his sixth and concluding lecture on Motion and Consciousness, taking for his subject the "Co-ordination of Modes of Motion and Modes of Consciousness." He said—In my first lecture I indicated to you, in a general way, that all the phenomena of the universe are reducible in the long run to modes of motion and modes of consciousness; in the second I proceeded to show what were the different kinds of motion which are observable, especially in living bodies; in the third I pointed out in what manner these different modes of motion are co-ordinated together; and then, in the fourth, we went on to consider how they were co-ordinated with the modes of motion in the external world; and in my last lecture I tried to give you some idea how the modes of consciousness are co-ordinated or arranged together. The last part of the consideration remains—how, in what way, are those modes of motion which take place in the body co-ordinated with the modes of consciousness which also takes place in the body, but which constitute the phenomena of the mind? That this co-ordination exists is a fact about which there can be no doubt. No one doubts that if the vibrations of the ether fall upon his eye he will have the sensation of light, for example. And no one who pays the least attention to what goes on within himself doubts that in the same way that sensations follow upon some kind of motions, so do motions follow upon some modes of consciousness, those we call volitions, for example. And the only doubt is whether those reproductions of sensation which we call memory, and those judgments which constitute a large part of our consciousness follow upon modes of motion. It is by no means so apparent as the relation or co-ordination of modes of motion and modes of consciousness in each separate class; but there is very great and constantly increasing reason to believe that the co-ordination which obtains in the latter obtains also in the former case. Let me point out one fact which shows this connection, and we may take, for example, the disturbance of the mental faculties, which follows upon the injection into the organism of some such substance as alcohol. If a man drink a glass of spirits it not only affects his bodily frame, producing, perhaps, increased temperature (I do not say whether the increase is real or apparent), but in addition to this there is a modification of his mental state; in some persons it produces that feeling which we call cheerfulness. It produces (especially if we drink more) a feeling of vigour and insensibility to obstacles, which is known by the name of "Dutch courage," (though the name is unjust, seeing the Dutch are amongst the bravest people in the world); at the same time, in most people this injection of alcohol produces a very rapid flow of ideas. And in this case there can be no direct action of the alcohol upon the mind, it cannot get at the mind, inasmuch as it is a physical substance, the particles of which are in a particular kind of movement, and by means of this movement the particles of the brain are affected in a particular way. If the quantity be increased to a certain limit, which varies in different persons, the memory becomes impaired, sensation becomes altered, the passions are stimulated, and the reason weakened, and the man passes from the condition of rationality and humanity to one of irrationality and beastliness. This is a case of the operation of alcohol upon the substance of the brain, and it is one of a large class of facts which tend to show the co-ordination of facts of consciousness with the movements of the cerebral substance. Sensations, whether original or reproduced, are connected with antecedent physical changes in the brain, and the judgments are so likewise, and in the case of volitions the co-ordination also exists, but the order is reversed—the state of consciousness precedes the state of motion. It is necessary to analyse a particular case to properly comprehend this—for example, the sensation produced when a hot body is brought near the surface of the body. We have already seen the nature of the apparatus engaged—the cells of the epidermis, the nerve and the central nervous organ, the grey matter. The sensation of heat gives rise through the cells to a molecular change in the nerve, which is transmitted as a nerve current to the grey matter, and puts that into activity. We know perfectly well that the co-ordination of the mode of motion of the nervous system with the state of consciousness does not take place in the nerve, but in the central organ. Whatever the nature of the sensory organ, or the sensation as far as we know, the nerve which conveys the impression to the central organ has always the same structure and the same properties, and the physical changes a nerve undergoes are always the same, so that the difference in the sensation cannot depend upon any difference in the action of the afferent nerves, but must entirely depend upon the nature of the receiving apparatus. The same wire may conduct an electric current which connected with one apparatus may deflect a needle, or with a different apparatus may heat a platium wire to glowing. I only mention these two cases to show how it is possible for the same conducting wire to give rise to different results. We must not push the analogy too far. But suppose you could make the needle feel its movement, or the wire feel its heat, then you would have precise likeness of that which happens when we have a sensation, and it would be neither more nor less wonderful than our sensations, which are in all cases the result of pure mechanical arrangement. And the great difficulty and problem is to understand how modes of motion and modes of consciousness are co-ordinated together. Let me represent the fact in another rough way—the modes of motion to be found in the universe are to be represented to the imagination by the image of a series of balls, one of which knocks against the next in succession, and so transmits any motion it has received; and if we imagine one part of the series to represent the afferent nerve, the next, in the middle of the series, sensory apparatus, and the other portion the afferent nerve, then the mechanism of a reflex action is perfectly intelligible.

The great question, however, is what relation is there between these modes of motion and the sensation? At first sight one is entirely baffled how to conceive of it; but the human mind is so constituted as not to rest satisfied without speculating and inventing hypotheses, or modes of imagining things. And this question has been the subject of many different speculations at different times. I will briefly speak of two or three of them, and I must remind you that I shall treat of them only with regard to their scientific relations. The first hypothesis I shall refer to is this—that underneath the modes of motion of the universe is a something, a substance which philosophers call matter. Everyone thinks he knows what matter is; he conceives it made up of minute particles in constant motion; this idea has been of great use in science. The greater part of the universe they assume to be made up of this substance—matter, our own bodies included, and that is supposed to be the subject of all the movements. But, besides this, they suppose the phenomena of consciousness to be similarly the properties of another substance which they call spirit, mind, or soul. One hypothesis assumes that the phenomena of consciousness are the properties, the result of the activity of what we will call mind, and the properties of matter are the result of the activity of matter, and that the two are absolutely indepent, absolutely incapable of acting upon one another in any way. For, as some of these philosophers have remarked, you can by no means conceive how matter, or that which is material, can act upon mind, or that which is immaterial. Now, some philosophers have fallen into a strange delusion, and have assumed that if you cannot conceive a certain thing, therefore that thing cannot be, and on this ground, because they could not conceive how matter could act upon spirit they concluded that such an action could not be. And this led to some strange results. For if there is no action of material bodies upon the mind, how is it that when pricked with a pin, for example, you feel it? How is it that sensations arise in my mind in accordance with things taking place in the outer world? Then, some philosophers imagined that the changes which go on in the matter of the body do not affect, in the slightest degree, those of the mind, but that the two systems have been so arranged that they co-exist independently, and go on together exactly like two clocks one of which is slightly in advance of the other. They assume that the relation between the phenomena of the mind and the phenomena of the body is one of correspondence, and not one of causation. There is a second view, the ordinary one, that material

substance can act upon spiritual substance; it may be so, but it is just as inconceivable as ever how a material substance can operate upon an immaterial, or *vice versa*. These hypotheses are termed dualistic, inasmuch as they assume the existence of two perfectly distinct and independent substances. Some deny that there are these two substance, they only allow that there is one substance—matter, and they say that the states of conciousness are only affections of this substance. This is known as materialism, and to some persons it seems a great scientific step; it certainly is a simplification, as far as this, that it substitutes one unknown substance for two unknown substances, but it is just as incapable of explaining the cardinal difficulty—What relation is there between matter and sensation?—as the other hypotheses.

There is yet another method of looking at the phenomena, which is as old as philosophy itself, but which was never stated with greater clearness and eloquence than by Bishop Berkeley; it is what is called "Idealism." On the face of it it sounds preposterous, for the idealist asserts that there is only one thing in the world—modes of consciousness. But it grows out directly from the consideration of the phenomena of the physiology of sensation. Let us go back to the fact of sensation, and take for an example the case of hearing. We saw that it was the effect of certain vibrations which affect the auditory nerve; this nerve transmits its molecular motion to the brain, and there a state of consciousness, a sensation, arises. What we have in the one case is according to universal admission the vibration of particles of matter, in the other the sensation of the hearing, and there is not the slightest resemblance between the two things. The sensation is a state of our mind, and there is nothing whatever parallel to it in the external world. And we may assert that if there were no animals in the world capable of hearing there would be no such thing as *sound* in the world. And the same reasoning will apply to each of the other senses—light, touch, &c. Therefore, when we say "The fire is hot," we make use of erroneous language; the fire is not hot, the sensation of heat is entirely in ourselves; there may be in the fire the *cause* of this sensation, but all the sensation is in ourselves. And each mind has its own conception of the sensible qualities of external things, just in the same sense as two people can never see the same rainbow. The sensible properties of bodies are dependent upon the minds which are affected by the sensation, and if those minds were to vanish so, likewise, would these properties vanish. And if this is true of the sensible properties of the bodies, it is also true of all their other qualities. So far Berkeley's argument is, to my mind, impregnable; but he made the same mistake as the others, in that he considered that what is inconceivable cannot be—he said that, therefore, the world has no existence. The whole thing is a mystery, and we must not take our faculties of conception for the real limits of things.

The Professor was very warmly applauded at the close of his lecture, and the hall was as crowded at this, the last, as at the first lecture of the course.

IRON AND STEEL INSTITUTE.

The second days' proceedings of the general meeting commenced by the President (Mr. I. LOWTHIAN BELL, M.P.) directing attention to the various specimens of iron, steel, &c., sent for the inspection of the members, and also to several silver tankards and cups, microscopes, &c., which he explained were intended for presentation to the Presidents of the Belgian Reception Committee, the local secretaries, and others, in remembrance of the visit paid by the members of the Institute to Liége last year. A bronze medal has also been struck commemorative of the occasion, and one of these medals is to be presented to each member of the Reception Committee. The President further announced that an address was in course of preparation which was to be presented to His Majesty the King of the Belgians. The objects for presentation, which are in themselves fine works of art, have been subscribed for by those members of the Institute only who visited Liége, and not by the general body of members. An early opportunity would be taken to present them to the several recipients, either personally or through the Ambassador in this country.

The first paper read was by Mr. A. SMITH, "On the Shaping and Finishing of Iron and other Metals by Solid Emery Wheels, and on Machinery Specially Designed for such Purposes." It was observed that the general rise in the price of labour and materials had caused the attention of manufacturers to be directed to the use of solid emery wheels as great labour-saving tools. Those made by imperfect processes were even found to do the work of a file or grindstone with economy. There were, however, several defects of manufacture and composition which had been overcome by the Ransome Stone Company, who were manufacturing discs—to which they had given the name of "Bessemer wheels"—made of the purest emery, cemented together with a material itself possessing very high cutting qualities. The author then compared the work done by the Bessemer wheels in grinding down steel and iron with that effected by the best grindstones, and showed that the Bessemer wheels far outstripped the stones for grinding power and durability. These wheels were now used in Heaton's grinding machines, an American invention, and the combination formed a most useful apparatus for grinding and polishing metals in the numerous establishments where they were required to be brought into shape. In short, the Bessemer wheel may be looked upon as a revolving file, and one, too, by which old worn-out files are speedily converted into various useful tools. A number of tools and specimens of iron and steel illustrative of the efficiency of the wheels were exhibited, and were explained by the author at the conclusion of his paper.

Mr. DERY thought Mr. Smith had forgotten to mention an important purpose to which emery wheels could be applied. They were using them in Belgium for turning and polishing their mill rolls. At the Esperance, and several other works in Belgium, they were using them; the wheel moved from one end to the other of the roll, and there was an automatic arrangement for sending it back again. In reply to the President, he stated that they were not using agglomerated siliceous wheels such as were described in the paper, but they were using emery-wheels.

"The Manufacture and Use of Spiegeleisen" was the subject of the next paper, by GEORGE J. SNELUS, who stated that spiegeleisen was of but small value formerly, but in course of time its use in the Bessemer process brought it into prominence, and raised its value. It was first made and used at the Ebbw Vale Works, and in time, as the market for it increased, its manufacture extended to other parts, and it had now become an important and an established industry. The effect of manganese in steel was to harden it without rendering it brittle. The manganese remaining in the steel after the use of spiegeleisen seldom exceeded 0·4 to 0·5 per cent. The characteristics of good spiegeleisen are—a highly crystalline fracture, with large clean cleavage planes, tendency of the fractured surface to irredescent tarnish, and the analysis should show 10 to 12 per cent. of manganese, 4 to 5 per cent. of combined carbon, less than 1 per cent. of silicon, less than 1 per cent. of phosphorus and copper, and traces only of sulphur and other elements. The object of its use in the Bessemer and Siemens process was to remove the surplus oxygen retained in the metal, and thus change the product from one very red short, though tough enough when cold, to a metal that will work well hot or cold. Mr. Bessemer has found that there remains in the metallic bath 35 per cent. of oxygen to be removed by the carbon and manganese of the spiegel, but he (Mr. Snelus had not found quite so much, mainly because in his case the process has been stopped a little earlier, but the general results agree pretty closely: 5 per cent. of spiegeleisen is found to be sufficient to remove the red shortness, and even a less quantity of the spiegel is used in the solid form; 5 per cent. gives about one fourth carbon and manganese to the bath, and was the quantity formerly used in making rail steel. Of late years this has been made harder, and 8 to 9 per cent. of spiegeleisen is used, which gives 4 to 5 per cent. carbon and manganese to the steel. A good white iron used in the place of spiegeleisen would give an increased yield, but probably not so good a profit. When melted speigeleisen is used the product is so far homogeneous that no practical difference can be detected by chemical analysis of portions from different parts of the same cast.

Mr. E. RILEY said that, as to crystallisation, 2 per cent. of manganese would give the cyrstallisation of spiegeleisen. Some iron was made at Pau which had the crystallisation of spiegeleisen, yet there was not a trace of manganese. He would mention that in 1858 he read a paper stating that the metal manganese would correct red-shortness. He had examined some horseshoe nails, which were very brittle, and he found them perfectly free from carbon.

Dr. LIEMENS suggested that it would be an interesting enquiry to ascertain how the spiegeleisen acted upon the iron, whether it deoxidises the iron, or whether it must be present in the metallic state. He was inclined to the latter opinion. He had found in the Siemens process that the manganese added to the bar was not able to remove the oxygen.

Mr. RILEY thought they might get a little more information from the study of other metals. The Americans had made chromium steel, which is a steel that contains no carbon. He did not believe it, but he thought they might try chromium as a substitute for manganese.

Mr. SNELUS enquired what amount of chromium Mr. Riley had found in chromium steel. He analysed a sample himself, but could find no chromium, but he found 1 per cent. of carbon. He must say, however, that the steel was of excellent quality, although it was mis-described.

Mr. RILEY did not estimate the quantity of chromium, but that it contained chromium there could be no doubt; it gave, for example, chromate of potash upon fusion with nitre. Some Canadian ore which he had analysed also contained chromium.

Mr. BAKER thought it was not proved that the oxygen was contained in the iron, but it might be taken up from the vicinity. It was more likely, he thought, to be be in the form of carbonic acid.

Dr. SIEMENS did not mean to say that the oxygen was in the steel in an uncombined condition.

Mr. MAYNARD said that as to the chromium steel, he took samples and made careful analyses, but he had never been able to find chromium. The steel, however, was of beautiful quality, and of fine silky fracture.

Mr. RILEY remarked that if chromium were used, it did not all follow that it would go into the steel; but there was no difficulty in getting an alloy of iron and chromium; indeed, they would very readily alloy, and he had made alloys up to 50 per cent.

The PRESIDENT said that as to the manufacture of spiegeleisen when it first came largely into use, it was clear to his mind that there could not be any great difficulty in producing it. He thought the advantage of its use might be due to the fact that sulphur and manganese were found not to co-exist. He used chloride of manganese in the Walker blast-furnaces about twenty years ago, and in that case the chloride of manganese was decomposed, hydrochloric acid being evolved, and the manganese going part into the iron and part into the slag. At Ebbw Vale, when they took up the question of manufacturing spiegeleisen, they, of course, overcame the difficulties. He did not believe that the quantity of carbonic acid depended upon the quantity of manganese present, but rather on the temperature of the furnace, and especially of the upper part of it. He agreed with Mr. Riley that the crystallisation was also independent of the manganese. The furnace would at a high temperature sometimes turn to making white iron, and often so crystalline that it might at first sight be thought to be spiegeleisen. To the best of his belief, the quantity of sulphur taken up in the blast furnace also depended upon the temperature of the furnace, and this was confirmed by an alkali process which he had tried. The temperature of the spiegeleisen furnace might be inconsistent with the union of sulphur with iron. He concluded by thanking Mr. Snelus in the name of he members for the valuable information contained in his paper.

"The Occlusion of Hydrogen by Grey Pig-Iron, and the Probable Absorption of the Vapours of the More Fusible Volatile Metals by Grey Pig-Iron heated in Vacuo, in vapours of the same," were considered in the paper by Mr. JOHN PARRY, which was next read. It was shown that on heating iron *in vacuo* with a view of determining the absolute amount of hydrogen and carbonic acid known to be contained in iron by Graham and others, a vacuum could not be obtained for any length of time at a high temperature, although at a common red-heat a vacuum could be readily got, gas being continually evolved in gradually diminishing quantity, the amount of carbonic oxide increasing with the temperature, this always occurring in spite of the following precautions:—Double porcelain tubes, with glaze between, glass tubes enclosing clay tubes, tubes heated in a fused bath of blast furnace slag; all india-rubber connections kept cool in vessels of water; dried pure mercury used for Springel pump; yet the evoltion of gas appears to be due to the iron, for empty tubes, as above, yield no gas. Failing, therefore, to ascertain the absolute amount of gas and iron, the amount of hydrogen which pig-iron previously fused *in vacuo* could absorb was determined by the use of a modification of Geissler's mercurial air-pump, connected with a porcelain tube containing the iron; on heating the latter in hydrogen, the quantity absorbed could be read off on the graduated fall tube of the pump, and was checked by re-heating the iron *in vacuo* (witrout removal from the apparatus), and collecting the gas evolved. Grey pig-iron thus treated absorbs about 20 times its volume of hydrogen, which is again evolved on heating *in vacuo* together with a variable quantity of carbonic oxid , source of the latter unknown. Carbonic oxide is not readily absorbed: four experiments gave no absorption, one with wrought-iron showed an absorption equal to 4½ volumes, and from 4 to 6 per cent. of the carbonic oxide used had been converted into carbonic acid. Fresh experiments are needed in this direction. Assuming hydrogen to be the vapour of a very volatile metal, it was thought probable that iron on being heated in the vapour of the more volatile fusible metals in sealed glass tubes, exhausted of air, might absorb these metals just as it would hydrogen. Experiments with zinc, magnesium, cobalt, bismuth, and cadmium, show that pig and wrought iron takes up minute quantities of the above metals. On re-heating the iron *in vacuo* (first carefully cleaned with acid and filed bright) distinct subsin ates were obtained, which proved with zinc and cobalt to be the metals; the others have not been examined. The quantities were too minute for ordinary analysis, and required the use of spectroscope. Pig-iron made from ores known to contain zinc also gives a faint sublimate on heating *in vacuo*, and showed faint indications of volatilised metal under the spectroscope, but no certain indica ions could be obtained, the apparatus used being imperfect. Pig iron fused with zinc and bismuth appears to retain traces of these metals. Copper treated as described absorbs zinc vapour, which is again evolved on heating *in vacuo*. The metals appear to alloy with iron, alloys being, according to Matthieson, solidified solutions of one metal in another, this essentially agreeing with Graham's explanation of the absorption of hydrogen by grey pig iron—the affinity of hydrogen for iron is as the attraction admitted to exist between a soluble body and its solvent. Deville, however, imagines a new kind of porosity in metals of a greater degree of minuteness than the porosity of graphite or earthenware: the intermolecular porosity of iron is not sufficient for the passage of gas at ordinary temperatures, but it is supposed to be developed by the expansive agency of heat.

Mr. RILEY remarked that he had made steel with arsenical ore, but he could always smell the arsenic in burning the steel. He was, therefore, somewhat surprised at Mr. Parry's statement upon that point.

The PRESIDENT, in giving the usual vote of thanks, expressed the hope that Mr. Parry would continue his experiments, and give the Institute the advantage of them, as researches of this character often led to results of the greatest practical value.

"The Condition in which Silicon exists in Pig-Iron" was then discussed, in a paper by Mr. E. HANDFIELD MORTON, who said he had been induced to make a few experiments by noticing that silica was obtained in an insoluble residue when pig-iron, containing a large quantity of silicon, was dissolved by diluting sulphuric acid *in vacuo* instead of silicon. This fact pointed out that the theory of silicon being intimately mixed with pig-iron was untenable. He had made a considerable number of experimeats with the view of ascertaining how far silicon existed in a state of combination with pig-iron. He had made the attempt to isolate the silicon in the pig iron by heating quantities of the iron with an excess of pure iodine in sealed tubes, all air being first displaced by carbon dioxide. At the end of 24 hours, all iodine vapours having disappeared, one of the tubes was opened, and the contents, upon being analysed, gave:—Iodine, 76·432 per cent.: iron, 29·013; silica, 1·769; carbon, 0·759 = 98·913. This pig iron was also carefully tested for graphitoidal silicon by treating the iron with hydrofluoric acid, the insoluble residue was filtered off and ignited to get rid of carbon, when the mere trace of a dark powder remained, which proved to be iron. From these results it might fairly be concluded that the silicon contained in pig-iron did not exist in the state of mechanical mixture, but existed combined with a portion of the iron as a silicide of iron, in the same manner that carbon existed as a carbide of iron, differing from carbon that it does not exist in a graphitoidal form in pig iron. He then stated that he had made experiments in order to ascertain whether or not the hypothesis of the combination of the silicon with the iron was correct. He had analysed the iron experimented upon with the following result:—Iron, 92·018 per cent.: silicon, 4·130 per cent.: graph. carbon, 1·622 per cent., showing a loss of silicon to the amount of 0·482 per cent. He had also endeavoured to ascertain whether hydrogen had the same effect upon the silicon contained in the white pig-iron as it had upon that contained in Bessemer iron: 0·420 grain of the white iron was heated in the same apparatus and under the same conditions that existed in the preceding experiments for six hours at nearly a white heat. When cold the iron was analysed, as was also the caustic potash solution, with the following results: Iron, 89·201 per cent.: graph. carbon, 1·060 per cent.: silicon, 4·287 per cent. He observed that a comparison of the results obtained from the two kinds of iron used showed that the effect of hydrogen upon the silicide of iron was identically the same. It might be fairly considered from the experiments he had made that silicon in pig iron was not contained in a state of mechanical mixture (except, perhaps, under peculiar circumstances), but as a chemical compound of iron and silicon dissolved, so to speak, in the pig.

PEAT FUEL MACHINERY.

At the Institution of Civil Engineers, on Tuesday, a paper was read on "Peat Fuel Machinery," by Mr. Joseph McCarthy Meadows.

This communication was directed to the consideration of points of difference in construction and arrangement in some examples of peat machinery which had been examined by the author. The mechanical systems in use were classified into the wet process for densifying and the dry process for compressing peat. The wet process macerated or mixed the raw peat, and for that purpose mechanism of the pug-mill class was usually employed. Of existing machines those of Schlickeysen, Rahder, and Clayton were referred to. In the Schlickeysen, or chief German machine, the twofold work of mixing and of forcing out the peat as a pulp under a moderate pressure was effected by one operation of the arms or blades on the upright shaft of the mill; while in the Rahder, or Dutch machine, the mixing and forcing were separate operations. The upper part of the Rahder pug-mill contained the vertical shaft, the arms of which simply mixed the peat, while in the lower part the pulp was forced outwards, under a moderate pressure, by a short horizontal screw or spiral. The same twofold action to some extent characterised the Clayton machine, with this difference, that the action of the screw or spiral was principally relied on, in combination with fixed cutters in the inside of the casing, for a fine comminution of the peat. The author was, however, of opinion that a rough effective mixing of the raw material was sufficient for making good dense peat, and that in practice mechanism for fine comminution was not desirable. The German and Dutch machines were stated to be capable of mixing and delivering, singly, about 60 tons of wet peat for each full working day, which quantity, when in usual air-dried state, would give from 14 to 15 tons of dense peat fuel; and practice had shown that a single machine, upon the pug-mill principle, could not be economically or usefully taxed to give any much larger production. The machine of Clayton had not yet been tested by working results of sufficient length spread over one or more full seasons, and accurate data as to its average capability of production were wanting. The proportion of water in peat was upon the average 80 per cent., and the treatment of 60 tons of raw peat in one machine in 12 hours would represent its mixing and delivery in the state of pulp at the rate of about 230 cubic feet per hour. Working arrangements were either fixed or transportable; of the latter kind the Rahder machine was instanced as a useful example. The author thought that the principle of transportability, by which the mechanism should constantly follow the excavation, was an essential requisite of commercial success where an extensive tract was to be worked. In the Rahder system the mills, with their portable engines (each from 6 to 8 horse power), travelled on rails laid temporarily alongside the line of excavation, and were thus kept close to the raw material, which would otherwise, if the machinery were fixed, have to be moved, with its 80 per cent. of useless water, to the place of manufacture. The same principle of transportable mechanism was carried out in extensive peat works in Bohemia. Eichorn's system of making ball turf by the wet process was next described, specially with a view to illustrate the application of fixed lattice frames for drying the peat balls. For each Clayton machine 9000 wooden trays were stated to be necessary for the drying; and the systems of Eichorn and of Clayton in this respect represented two distinct modes of arrangement.

Mechanism for disintegrating raw peat by rollers or cylinders armed with teeth or points was next referred to. In some instances the functions of machines of this kind were simply confined to producing pulp from peat without delivering it in shape. The mass of pulp was in such cases spread on the drying-ground and divided into pieces by hand. Challeton's system, by which raw peat was reduced by copious addition of water into a thin fluid state, in which condition it flowed into shallow basins for filterage and partial drying, was next described, but the principle was not thought to be conducive to economic production. The extent of shallow reservoirs that would be requisite, and which, unless roofed over, would be available only for the few fine months of the year when peat could be made in the open air, did not constitute an improvement.

Exter's system for making compressed peat by the dry process was next detailed. The peat was obtained in a fine condition by a thin slicing of the surface of the bog, partly dried in the open air, and finally by artificial heat, and was then compressed by direct mechanical force by iron rams or plungers worked by steam-power from eccentrics.

In reference to the production of dense peat by the wet process, it was stated that on the Continent, in 1872, the cost varied from 6s. to 7s. per ton. With the present price of labour in this country, the author thought the cost, when spread over a full year's expenses, could not be safely estimated at less than from 7s. to 8s. per ton. Economies might hereafter reduce the cost from 6s. 6d. to 7s. per ton, but not to less; and estimates based upon lower rates were, in the author's opinion, not reliable. As compared with an average of four varieties of German coal, the heating power of peat was stated to be about 60 per cent. that of coal. This result was arrived at in practice in Southern Germany, where peat was largely used for locomotive purposes, and in this respect, weight for weight, light fibrous peat gave as good a result as dense or compressed peat, the advantages of the latter consisting solely in the reduction of bulk and the concentration of the original quantity of peat in a smaller space. The economic worth of that reduction was, practically, the measure of the increased value given by mechanical systems to peat. The author thought that in the vicinities of bogs, where the use of peat in its ordinary condition of cut turf had been established, changes were not likely to be made in the regular mode of preparation for local purposes, but if the market could be profitably opened for peat fuel at a distance the reduction of its bulk would become of importance. As dense peat made by any system of the wet process gave, when charred, a firm charcoal, which was not obtainable in compact condition to the same extent from peat simply cut and dried, the author thought—looking to the great stores of coal in Great Britain—it was in that direction most hope lay for the advantageous application of mechanical processes. He supported this view by stating that in most cases abroad the adoption of mechanical systems might be traced to necessities which had arisen either from inferior character or local circumstances in connection with peat deposits there, which did not exist to the same extent in the deposits of peat of superior class which were found in these countries.

The paper closed with particulars of some laboratory tests, carefully conducted by Prof. Galloway, of the Royal College of Science for Ireland, to ascertain the absolute heating power of peat. Three samples of dense peat made from the upper, the middle, and the lower portions of an Irish red bog were used, each being in the best possible air-dried state. No. 1, from the upper fibrous portion of the bog, had a specific gravity of 0·637, weighed 39·81 lbs. to the solid cubic foot, and gave an absolute heating power by Thompson's instrument, equal to 6·05 lbs. of water at 212° Fahr., converted into steam by 1 lb. Sample No 2, from the middle of the same bog, had a specific gravity of 1·000, weighed 62·50 lbs. to the solid cubic foot, and gave an absolute heating power equal to 5·50 lbs. of water at 212° Fahr. converted into steam by 1 lb. Sample No. 3, made from the lower portion of the same bog, had a specific gravity of 1·173, weighed 73·31 lbs. to the solid cubic foot, and gave an absolute heating power equal to 6·33 lbs. of water at 212° Fahr. converted into steam by 1 lb. Although differing in relative densities, the heating powers in respect of equal weights did not materially vary. When compared, however, in respect of their relative bulks, one cubic foot of No. 1 peat would be found to give an absolute heating power equal to the conversion of 240·87 lbs. of water at 212° Fahr. into steam, while Nos. 2 and 3 would give respectively 343·75 lbs. and 464·07 lbs. of water converted in like manner into steam from 212° Fahr. for one cubic foot of each.

CALDBECK FELLS LEAD AND COPPER MINING COMPANY—A PRESENTATION.—On Saturday, May 2, the miners of the Caldbeck Fells Mines presented Capts. PHILIP HAWKE and TREVARTHEN, the manager and second agent, each with a beautiful silver cup, as a mark of their esteem for those gentlemen on their leaving the company's service. We, the miners of Caldbeck Fells, have the pleasure of knowing that the mines have been energetically and practically developed by them during their servitude to the best possible advantage to the company and general satisfaction of the workpeople. The whole of the workmen assembled in front of Capt. Hawke's residence, where the presentation was made by Mr. Thos. Brooke, who referred to the good feeling that existed amongst the workpeople towards their late employers. Mr. John Nicholl subsequently addressed the audience, and spoke in the highest terms of the abilities of their manager, Capt. Hawke, and his assistant agent, Capt. Trevarthen. Mr. Nicholl said that the presentation was the best evidence of their esteem and good wishes for these two gentlemen on their leaving the Caldbeck Fells Mine that he and his fellow-workmen consider the services of such mine agents invaluable to any mining company. Their steady conduct and good behaviour, combined with such an amount of mining skill, is most creditable to themselves, their employers, and the employed. We, the miners, observed that every effort possible was made by these captains to promote the welfare of the company. The skill shown by them in in the interior as well as the exterior of the mine is highly appreciated by all concerned. The excellent machinery that has been erected under the supervision of the manager, Capt. Hawke, and his assistant, Capt. Trevarthen, without the aid and assistance of an engineer, is most praiseworthy to them. In fact, they must have saved the company a large sum of money, for their physical and mental labours for their employers were unceasing. Capt. Hawke, on receiving the presentation, said—"My friends, had you assembled here with no other motive but merely to give me the time of day I would have appreciated your visit; but to know that you have subscribed to the amount of this beautiful cup, and presented it to me a free gift, I feel not only thankful to you for it, but I am much affected by your kindness. If do not know in what instance I could have made myself deserving of the favour: in fact, I have had a poor mine, and I have not been able to deal liberally with you in your earnings. In presenting the directors with the monthly cost-sheets they would remark, if there was the slightest chance, that A, B, and C partnerships have got good wages this month. My reply would be, 'Yes, gentlemen, they have; but allow me to refer you to D, E, F, G, and H partnerships; I am heartily sorry to pass such earnings from the pay-table to the workpeople.' The directors would reply—'But unless we get sufficient lead into the market the costs cannot be paid, for we have no funds.' I assure you that it has been a struggle between the employer and the employed. My friends, I shall value this beautiful silver cup beyond anything I have in my possession. I pray you, therefore, to accept my warmest thanks for this presentation." It was observed here, by the audience, that Capt. Hawke intended to have prolonged his remarks on the occasion upon which they were assembled together, but he became so much affected that he was unable to proceed, beyond saying he wished to remark that he was much interested in the welfare of the mine, and begged to propose three cheers for the Caldbeck Fells Mining Company, from whose service he had retired; three cheers for his successor, Capt. Polglase; and three times three for the workmen. After which cake and wine were liberally distributed amongst the guests, and the whole scene was one of a happy family. The proceedings terminated with three times three for their late manager, Capt. Hawke, and his assistant agent, Capt. Trevarthen. Mr. Bewes, from Wigton, photographer, took a sketch of the whole company.

HOLLOWAY'S PILLS.—There is nothing in the whole "Materia Medica" like these medicaments for the certainty of their action in lumbago, sciatica, tic doloreux, and all flying or settled pains in the nerves and muscles. Diseases of this nature originate in bad blood and depraved humours, and until these are corrected there can be no permanent cure. The ordinary remedies may afford temporary relief, but in the end always disappoint the sufferer. Holloway's ointment penetrates the human system as salt penetrates meat, and the pills greatly assist and accelerate its operation by clearing away all obstruction, and giving tone to the system generally. The prophylactic virtues of Holloway's remedies stand unrivalled.

The stone is improving as we go north.—Tributers (Prospecting Shaft): Have crushed for the month 38 tons of stone, result 11 ozs. 15 dwts. of retorted gold. In consequence of their driving 60 ft. of dead work and loss of time through foul air, the quantity of stone got by them is but small. Their stopes are in good working order now, and I expect much better returns from them next month. The machinery and appliances are all in their usual good order.

AUSTRALIAN CENTRAL (Gold).—Mr. Gill, Fryerstown, March 25: In my last report I mentioned that I anticipated being in blocking order about the middle of this month (March). The intense sultriness of the weather for some days compelled me to open up the mine more thoroughly than I intended in order to secure better ventilation. This work will be completed by the end of the week, and on April 1 I hope to leave the full complement of men underground, and the mine in paying order. Judging from the several drains put across the main gutter the ground should pay a very good and continuous profit, however the result will now be shortly known. I am using every endeavour to work the mine as economically as I can, and intend trying the experiment of reducing the wages of the miners to the old standard of 7s. per shift, instead of, as at present, 7s. 6d. per shift, a difference of 3s. per week per man. Unfortunately, the working men here are getting the upper hand, as in England, and I may have some trouble in effecting the change. Capt. Angwin's report is not to hand; I fear he has mistaken the date of the mail's dispatch. I can, however, state all is working smoothly and well." Mr. Gill also writes:—"I am glad to state I have been most fortunate in my purchase of a new winding-engine; after a good deal of trouble and delay I succeeded in buying a 20 horse power engine in Melbourne, at invoice price, plus the colonial duty of 20 per cent., and consider I have saved nearly 60*l.* by the transaction, as machinery is not only scarce just now but very dear. I am busy now about the erection, and hope to have it completed in about a month. The cost of the engine is 240*l.*, and it is heavy enough in case of accident to the present pumping-engine to keep the mine dry, a very important consideration."

ENGLISH AND AUSTRALIAN (Copper).—Port Adelaide, March 28: The stock of coal on hand was about 2000 tons. At Port Adelaide Works all the furnaces were in full work. Since date of last advices about 130 tons copper has been shipped.

SCOTTISH AUSTRALIAN.—The directors have advices from Sydney, dated March 21:—The sales of coal from Lumbton Colliery for the month of February amounted to 7270 tons. The manager reports that the company's trade, which had been slack during the first two months of this year, was increasing again in March.

BREMER.—The directors learn by last advices that the mine is looking better than it has done since it started. The various workings are showing good and improved results. The quantity of ore raised during the month was—dressed, 26 tons; undressed, 470 tons. By telegram they also learn that the new crushing and dressing machines are completed and at work, whereby saving of cost and increased efficiency are secured.

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received May 11, per Olbers, dated Morro Velho, April 11:—

THE OPENING INTO THE LODE FROM THE TRAMWAY.—The level in B shaft is being gradually increased. We have now space to admit of 30 borers being employed in that opening daily.

B.—The following measurements show the size of that opening as taken on the 1st instant:—

Length driven in the lode	4 fms.	1 ft.	0 in.
Height of space in the lode	2	3	9
Width of ditto north and south	4	4	4

A.—The excavation has now attained the following size, as per measurements made at same time:—

Length of excavation	13 fms.	1 ft.	0 in.
Width of ditto at eastern end	2	5	7
Width of ditto at western end	5	4	3
Height from bottom of stopes	10	5	0

At present we are hauling and raising from these excavations pure minera. at the rate of 130 wagons per working day.

In the inner part of the lode reached from the level at B, the mineral appears to be as good and free from killas as that raised in the excavation at A. The ore quarried up to the end of the month was not so good as that we have now reached, being then of a more mixed character.

Advices received MAY 14, per Boyne steamship, dated Morro Velho, April 16:—

GENERAL OPERATIONS.—Since the date of last advices our general work has gone on steadily, though the duty in the mine has not been quite so good during the past fortnight. The lode where opened into in the opposite level from B shaft, and more especially the part now reached, where the ore is very compact and hard, is found very difficult to bore. The task of boring (4 palmas) can scarcely be effected during the eight-hours corps.

PRODUCE FOR MARCH.—The gold extracted during the month of March (one day of which, it will be remembered, was taken into the month of February) amounts to 20,746·3 oits. It has been derived as follows:—

	Oitavas.		Tons.		Oits. p. ton.
Mineral from A excavation	17,467·8	from	2219	=	7·962
„ B „	1,356·9	„	234	=	5·798
	19,024·7	„	2453	=	7·755
RE-TREATMENT:—					
Morro Velho arras...	1443·0				
Praia ditto ...	278·6 = 1,721·6			=	0·701
Total	20,746·3			=	8·456

Oits.	Ozs. troy.	Tons.	Oits. p. ton.	Ozs. troy.
March produce..2,746·3 ...	=2391·7108 ...	from 2453 ...	=8·456 ...	=·9745 per ton.

The above is an increased produce, compared with that obtained in February, chiefly owing to our having raised an increased quantity of mineral, and also to its being of good quality. That from the excavation at B has given as yet a lower yield, but the part now reached is in good and pure ore.

Including the latter, which only gave 5·798 oits. per ton, the yield from the mineral treated during the month, 8·456 oits. per ton, is exactly the same as was realised in the treatment of the mineral in February.

COST AND PROFIT.

The produce for March being ...	20,746·3 oits.			
Deduct loss in melting into bars	43·4 „			
	20,699·9 oits., at 7s. 9d. per oit. =	£8,021	4	3
COST.—Less sums receivable from the road contracts		4080	18	7¼
Profit on working for March		£3940	5	7¼

Taking into consideration our present sphere of working, the still limited spaces excavated, and that we are only getting about 25 wagons of ore daily from the lode opposite the level from B, the above amount of produce, and the produce shown on the month's working should be considered satisfactory.

GOLD EXTRACTED TO DATE.—The gold extracted during the first division of April, being a period of eight days, has amounted to 5331·7 oits. It has been derived as follows:—

	Oitavas.		Tons.		Oits. p. ton.
Mineral from A	4350·6	from	531	=	8·193
„ B	472·7	„	92	=	5·138
	4823·3	„	623	=	7·742
Re treatment	508·4				
	5331·7				

Oz. troy.		Tons.	Oits. p. ton.	Oz. p. ton
Total	614·6581 from	623	= 8·558	= ·9866

From the appearance of the ore being raised at B, I expected a somewhat better yield from that mineral, but, according to the assay, the above produce is about a fair return from the mineral stamped.

The ore from A has given a good yield per ton for the first division's stamping.

We have had acute bronchitis amongst the children of the establishment, which has proved fatal in two cases, otherwise the health of the people generally is good.

The GOLD TROOP was dispatched from Morro Velho on April 13, taking eight boxes, containing 23 bars of gold, weighing in all 37,110·7 oits. = 4278·2584 ozs. Troy, for shipment per Boyne, for delivery in London.

N.B.—The gold has duly arrived.

DON PEDRO NORTH DEL REY.—Report for March: Produce and Cost: Produce, 643 ozs. troy, 2371*l.* 1s. 6d.; cost, 3057*l.* 4s. 7d.: loss, 686*l.* 3s. 1d. —First Division of April: Produce weighed 1500 oits. Nothing fresh to report, all work in hand proceeding favourably.

ROSSA GRANDE.—Report for March: Produce, 1406 oits. at 8s., 562*l.* 8s.; cost, 1122*l.* 1s. 2d.: loss, 559*l.* 13s. 2d. The daily average of force has been 185·1.—First Division of April: Extract from letter, dated April 16:—Bahu: The mineral being extracted from the Bahu is of better quality than that of last month. Stoping is being carried on in back and bottom of the 18 and 28 west. In the western part of the Bahu we have commenced to drive east on some auriferous branches of lode intersected in sinking a trial shaft, referred to by Mr. Hilcke, in February, 1869. The lode is improving as we advance with the level.—Cachoeira: During the past week we have made fair progress in draining the water in this mine. We are now within 4 ft. of the 20 fm. level.

RICHMOND CONSOLIDATED.—Telegram: "Week's run, $17,000; start second furnace to-morrow.—MCGEE."

CEDAR CREEK (Gold).—Col. Ludlum, May 11: Telegram: "The gross returns are $29,500 for April. Running expenses, $14,500. Profit, $15,000."

CHONTALES.—Mr. Smeddle (April 5) reports:—On account of several feast days during the past month, and the present week being 'Holy Week' (during which time the natives do not work) we have not been able to keep up a good supply of quartz. No work has been done in the mines since the 1st instant. The whole of the natives are at present in Libertad, and I do not expect to commence before the 8th. The quantity of ore treated has been 1685 tons, from which we have obtained 360 ozs. of gold, being an average of a little over 3½ cwt. per ton. We value the gold obtained at 841*l.* Our cost for the month has been 656*l.*, leaving a net profit of 185*l.* The above cost includes the sum of 18*l.* charged to construction account.

MINERAL HILL.—Mr. Oakes, April 20: We have raised during the week 60 tons of ore, of an average grade of 841 per ton, at a mines' cost, including stores, materials, and sorting waste dumps, of $964·04.

COLORADO TERRIBLE LODE.—Captain Lampshire, April 21: The fifth level has much improved, and the vein of ore 3 in. thick, of good quality. No. 7 stope, in the 5th level, is a new stope; the lode is large, and yields a large quantity of second-class ore. In No. 2 winze, in the fifth level, the vein of ore is 6 in. wide, solid, and of good quality. No. 1 stope, in the sixth level, is looking well; the vein is from 3 to 4 in. wide, and of good quality for shipping. In the west drift, in the sixth level, the lode improves the further we drive west; the vein is from 4 to 6 in. wide, and yields some first-class ore. The general appearance of the mine has greatly improved in the last week, and I think there is no doubt but that it will improve right along, for our sixth level drift is getting into the big bunches that are gone down in the bottom of the fifth level, which far exceeds anything that was ever before seen on the Terrible Lode. We have received bill of lading for the 40th shipment of about 9 tons, valued at 900*l.* Ore delivery, 4 tons 1750 lbs. second-class to Stewarts. Sale of tribute ore, 9 tons 1970 lbs., to Stewarts, value $1191·70, one bind of which I send to the company.

ALMADA AND TIRITO.—The directors have received advices from Mr. Clemes to April 2. He had then got into the old workings of the Mina Grande, and was pumping the water out, so as to be able to report on the lower workings, which he expected to be in a position to do in a few days. The workings in the Tirito and Providencia Mines were looking well. A further bill of lading has been received of 55½ American tons of concentrated ore, half of which will go to Liverpool and half to Freiberg. The directors have just obtained an analysis from Messrs. Johnson and Sons of some Mina Grande ore sent by Mr. Clemes. Half of each sample sent was crushed, and the assay for silver for the whole averages 99 ozs. per English ton, which is considered highly satisfactory, as the samples are uncon centrated. The lode varies from 14 to 22 feet wide, and increasing in width as it goes down.

Telegram.—Profit for the month of January, $1672; profit for the month of February, $5318. From these amounts $4442 and $5000 have been respectively written off against machinery taken from the stores. Profit for the month of March, $4581.—April 23: Concentrated black ore stopped for want of water; pro spects good.—Mina Grande: Mine improving; working satisfactorily.

BLUE TENT CONSOLIDATED HYDRAULIC GOLD MINES OF CALIFORNIA.—C. W. Tozer, April 20: Since date of my last (April 12) I have nothing of special importance to report. The weather is fine, snow quite disappeared from vicinity of the mine, water abundant, and washing going on vigorously and uninterruptedly. Three giants almost continuously at work in Enterprise, and one in South Yuba claim as constantly as is possible under the circumstances attending the commencement of operations at this claim. I have put the water-power derrick purchased with this property in good repair, have erected it on the ground, and now have it in successful operation. The expense of new material, labour of repairs, and for the erection of the derrick, has not been far from $500; a new one of its capacity would cost $1800 or $2000. By the use of the derrick we can now lay aside out of the way of our washing boulders of the weight of at least 4 tons, and, perhaps, 5 tons. This is, of course, much cheaper than to blast them, and purchase water to wash them away piecemeal. The putting in place of the derrick, the powder blast, and other works of preparation for constant washing at South Yuba has, of course, caused some unavoidable though much regretted delay. I am pleased to write that this work has been well and substantially done, and washing will proceed with but little interruption until the end of the season. I am making another small drift for powder blast on left hand side or corner of the pit at South Yuba, and hope and believe we shall be able by this blast and former one to so relieve the large blast (1200 kegs powder) put in by our predecessors that we shall derive great benefit therefrom, and hasten the day when we shall reach the centre blue gravel channel. I have now a very large and fine undercurrent in use (a new one) at the end of flume No. 8 in Enterprise Ravine. We must multiply our undercurrents as fast as places can be formed for them until we have eight or ten instead of the five now in use. The experience of this winter has taught me more than ever their great value for saving fine gold when well built and properly used. I have no doubt fully 50 per cent. of all the gold heretofore washed from the extensive excavation on Enterprise claim has been carried into the river and lost. Forty per cent. of this loss can be saved, with no other expense than the erection of undercurrents, and the small additional expense of operating them. The cost of an undercurrent at Blue Tent will vary from $300 to $500, and each one I think will add to returns from $300 to $500 every 30 days. Since roads became passable we have kept our team hard at work delivering lumber from the mill (thus saving 25 per 1000 ft.) paving blocks, paving rocks, &c. They have already saved more than cost of horses, wagon, and harness. I mention this fearing you might think the purchase extravagant.

Telegram.—Col. C. W. Tozer: "We have cleaned up after a run of 25 days on the Enterprise Claim; the gross returns are $9500; the running expenses, $4500; the profit is $5000."

BATTLE MOUNTAIN.—Capt. Richards, April 23: In the 188 feet level, north of the new shaft, the lode is of a very fine appearance, composed of gossan and green stains, and has produced during the past week some exceedingly rich ore in red oxides and green carbonates, being at one time fully 1 ft. wide, of solid ore, giving, in my opinion, abundant evidence of large bodies of ore at deeper points. In the 70 ft. level stopes, south of Pryce's shaft, some good ore in green carbonates is being obtained. We raised 145 sacks.

EXCHEQUER (Gold and Silver).—L. Chalmers, April 16: The Acacia adit was driven 10 ft. last week, in very hard rock. I had two men working in Roche's stope one day; I have put these men now to cross-cut in another place, until I am able to get to work again in the 100. I am able to keep the water out of the lower levels, but finding there are no boiler tubes of the size I want in Virginia city (the nearest mart) have written to Sacramento to see if I can get them there. Another heavy fall of snow last night and to-day. I am rebuilding the old flume across the creek, and hope to have tubes for the boilers from Sacramento next week, when the boilers will be repaired, the shaft finished, and stoping commenced.

— April 20: The Accacia tunnel was run 7 ft. last week. I have sent my team to Carson for provisions. The water is kept out of the lower works. I expect to hear from Sacramento as to the boiler tubes about the 24th. I have two men cross-cutting to find the lode in the main shaft; they are drifting through casing matter, mixed with porphyry. I have two men fixing the flume.

I. X. L. (Gold and Silver).—Mr. Chalmers writes, April 16: During last week two men were timbering the north drift. I had two men cutting wood, and the oarmen were shovelling snow to clear the drains and flume. I have got three miners to work in place of the two that left, so that when the timbering is finished I shall have full shifts in both drifts. The melting snow is giving us more water, but our new pump is quite equal to it, though we burn a little more wood and use more tallow. This is the worst season for water. My foreman nearly lost his life last week going up to the mine.

April 20: During the past week I have had to put nearly all my force to timber the north drift. Since the snow has commenced thawing the water has increased consi erably, and softened ground that I thought might have stood without timbering. I have consequently had to go back and timber to prevent caving. The night shift only has worked in the face, and made 5 ft., making a total of 195. No material change in the lode. I shall have full shifts in both drifts next week. I have two men cutting wood for the engine.

CAPE COPPER.—Bill of lading is received for 620 tons of ore, per Antonio Vinent; 550 tons of ore were sold at public ticketing on April 28, at an average of 15s. 0½d. per unit, realising approximately 12,900*l.*; 645 tons of ore have been put forward for sale by public ticketing on 26th inst.

The Trial Mines report is received, but does not show any material alteration from the last. Heavy rains had fallen throughout the colony.—Railway: Traffic for fortnight ending March 21, 175 tons up and 525 tons down. Bills of lading are received for 390 tons of ore and regulus, per steamers Galley of Lorne and Roman.

BENSBERG.—C. Craze, May 9: Victoria Shaft: The ground here is harder than it has been: this I consider a good indication, as our lode generally makes better in the hard stone; the lode has already improved, now worth 20*l.* per fathom; and I am pleased to say the men are making good progress in sinking, considering the hardness of the ground.—New Shaft: The lode in the level east of this shaft has a little improved; now worth 15*l.* per fathom, with a very promising appearance. The lode in the level west of shaft is of about the same value as last reported—20*l.* per fathom. There is no change in the level west of open-cast, and we have now put the men to drive south to see if there is a better part of the lode standing. The other parts of the mine the same as last reported. One of the new jiggers having been delivered on the mine, we are now fixing it as fast as possible, and hope to get it working by the end of this week.

PESTARENA UNITED.—Thomas Roberts, May 4: Val Toppa: The end south of the cross-cut in No. 4 level was driven during the past month 5·90 metres, and is now reset to six men, for May, at 65 francs per metre. The flat-course and branches in this end are now 3 ft. wide, mostly quartz, spotted with pyrites, and carrying stones containing lead, blende, and iron pyrites, or at times forming a leader on the under portion of the lode about 5 in. thick. From this end we have had four trials during the past month; the first—an assay of stones picked out from the soft part—gave 1 oz. 6 dwts. 3 grs. of gold and 2 oz. 11 dwts. 6 grs. of silver per ton of ore; in the second trial the soft or dig part of the flat-course, amalgamated by the small mill, gave 4 dwts. of gold per ton: the other two trials of stones from the lode did not show so well. The appearance of the lode has, however, very much improved since last month, and I hope to be able to report shortly a further improvement in the end of No. 4 south. The winze on the quartz lode in this level was sunk in April 80 centimetres: the lode is 18 in. wide, composed of quartz. This winze is down 13 metres, and is now suspended from the influx of water. No. 5 level was driven last month 4 metres, and is set for May at 57 francs per metre; the channel in this end has changed; it is much smaller, and has been more irregular in the last 3 metres driven. With a view to ventilate this level we have erected a Spanish blower (waterfall), and placed air-pipes through nearly the whole length of No. 5: this apparatus will be completed in the course of a few days.—Battiggio: The Ribasso Sasso level is now in from the face of the mountain 39·58 metres, 2·38 metres of which were driven in March and April, reaching the calculated line of a shoot of ore worked on shallow by the Romans. The lode and branches at this point are small, divided over a width of about 3 ft. A sample amalgamated from this end shows the picked stuff to be worth 3 dwts. 8 grs. per ton. On the west side of this end a caunter branch is taking towards the footwall, and will very likely intersect it in 4 metres; for this reason it would be advisable before totally abandoning this adit to drive (say) 4 metres more on the lode to reach this expected intersection, where, very probably, richer ore would be met with. In order to examine these old openings we have removed about 52 cubic metres of rock and dirt, and cleared and examined other 13 metres of old openings (levels), but as yet not much of value has been met with. On May 2 we suspended all works at this mine, and have sent the men on to Pestarena, where we were short of hands.—Battiggio Establishment: During April a part of the bank on the side of the upper water course slipped down, carrying away part of the launders; the broken launders have since been removed to the works. Some necessary repairs to keep up the roof over the ore-house were done during April.

PONTGIBAUD.—W. H. Rickard, May 1: Roure: The sinking of the new engine-shaft below the 60 metre level goes on favourably: we have began to divide and case the shaft from this level to the surface.—Virginie's Lode: The 80 metre level north is in hard spary ground. The same level south is in soft wet ground; the lode during the month has yielded barytes spotted with ore. The 60 north is unproductive. The 40 south yields ¼ ton of ore per current metre, and the same level north yields a little coarse quality saving work. The 20 rise south opens good tribute ground, worth ¼ ton per metre. The winze in the 60 north is poor. The adit south yields a little saving work, and the lode is improved in appearance. The adit north yields ¼ ton of ore per metre. The rise in the back of this level yields a little coarse work. The 20, south of the mill shaft, yields a little ore in soft decomposed mundic. The rise in back of the adit has opened ground worth ¼ ton per metre during the month, but has become unproductive. The stripping down the part of the lode left in driving the level produces well; at two points yielding about 1 ton of ore per current metre.—La Grange: The 120 metre level, north of Nosky's shaft, has entered a strong, kindly lode, yielding ¼ ton of ore per metre. The 100 cross-cut west is without change. The intermediate level, between the 80 and 100 yields ¼ ton per current metre.—La Brousse: The 140 metre level south yields ¼ ton of ore per current metre. The 120 south is without change, yielding a little ore-stuff. The 100 south yields 1 ton per current metre. The stripping down of the lode behind the end gives 2 tons per metre. The 60 south is unproductive. The stripping down of the lode in the 40 yields ¾ ton per metre.—Pranal: St. George's shaft, below the 70, is in very hard wet rock, consequently progress is small, notwithstanding our best efforts. The 70, north of this shaft, on the main lode, yields ½ ton of ore per current metre. The same level north, on St. George's lode, is poor. The 70 south yields ¼ ton of ore per current metre. The 50 north is poor. The winze below this level, a little ahead of the 70 end, yields ¼ ton of ore per metre. The shallow trials continue on regular lodes, but without any ore.—Surface: We have resumed our buildings at Roure, also the making of preparations for fixing a new wheel to lift the sands to a higher level at the Caravaux laveries. Our dressing has gone on regularly throughout the month, and the samplings have amounted to 305 tons.—St. Amant: The lode in the 45, north of Susan's shaft, yields stones of quartz spotted with ore. In the same level south we have found good stones of ore in the footwall. The 25 north is unproductive.

[For remainder of Foreign Mines, see to-day's Journal.]

INDEPENDENCE (Gold Quartz).—Further information relative to the strike of rich gold quartz reported in last week's Journal has been received from the superintendent of the mine, to the effect that he anticipates "making a better showing, both as regards the cost of extraction and value of gold per ton of quartz than has ever been made before below the adit level;" and the financial agent also writes that the discovery has laid open 2000 tons of rich gold quartz, sufficient to supply the mill for 18 months. The mill was expected to start crushing the quartz about May 1. The shareholders may be fairly congratulated on possessing a really good mine, seeing the vein is the same as that worked on in Sierra Buttes, the adjoining mine, and is continuous without break from one mine to the other, and for miles both east and west of both mines. Sierra Buttes made 5000*l.* profit for the month of March, and there seems no reason why Independence should not develope into an equally profitable mine.

FORTUNATE MINER.—The richest man in the world is a Mr. Jones. He hails from Nevada, U.S., and is a Senator, whose speech on the recent "Inflation" Bill caused a great sensation. His annual income is said to be 1,200,000*l.* He is the owner of the most productive mine known, a large silver mine, which gave him recently as his share of the profits 50,000*l.* a month. This amount has been doubled by the discovery of a new vein. In England, the Duke of Westminster and the Earl of Dudley are supposed to be the richest men, but it is doubtful if in ordinary times—that is when coal is not up to the late extravagant figure—they make more than half of the income of plain Mr. Jones.

NEW ZEALAND KAPANGA GOLD MINING COMPANY (Limited).—Works are proceeding satisfactorily in this mine, and preparations being made to resume sinking the shaft at an early date. The building in of the first boiler has been completed, and steam was got up on Tuesday, and a trial start made with the machinery, which appeared to work satisfactorily. The shaft at the present time is down 150 ft. At 300 ft. it is the intention of the manager, Captain Thomas, to open out and drive to cut the lode—although 600 ft. will have to be sunk before intersecting the lode in the shaft. Allowing that the shaft be sunk 6 feet per week after getting a good start, the 150 ft. should be down in about 25 weeks. This will be the point at which it is the intention of the manager to open his first adit, and by driving 170 ft. will intersect the lode 80 ft. below the old Kapanga winze; this, with 80 ft. sunk on the lode by the manager of the old Kapanga Company, Capt. Reeve, will give backs on the underlie of the lode of about 150 ft. It is well known that Mr. Reeve left good gold-bearing stone at bottom of the winze in the old workings, with the lode making stronger, and showing a decided improvement on the block stoped down immediately above the level, leaving no doubt in the minds of those competent to judge of such matters that the gold is there; and when it is known that already 2 tons of gold have been taken from the same lode by the former company who mined the ground, the shareholders may be congratulated upon being possessed of very valuable property, which only requires developing to make it the first mine in New Zealand; and also of a manager of no ordinary ability, whose untiring energy has surmounted the greatest difficulties, and brought the works to their present finished state. The company got their efficient machinery from Messrs. Harvey and Co., ironfounders, of Hayle, Cornwall. The manager has had no colonial assistance in performing his work, his attention being solely directed on the undertaking, assisted by Messrs. Clymo, Verran, and Andrews. With ordinary good fortune and speed in sinking it is calculated the old reef will be in hand in six or eight months time, when the prospects of this company may be looked upon as assured.—*Coromandel Mail*, March 12.

NEW ZEALAND QUARTZ CRUSHING AND GOLD MINING COMPANY.—Since the resignation of the late manager (Captain Thomas) this company seems to have gained neither funds nor friends—not that any fault can be found with the present manager, Mr. A Pittar. Had the company's representative been in a position to purchase the late Beach and Green Harp claims during the crisis here they would now be possessed of a property which would not only, with a little outlay, and under the supervision of a competent mining engineer of colonial experience, have recouped the original outlay, but the shareholders would have been possessed of what is now proved to be a most valuable property. What was purchased a few months ago for 500*l.* is now worth as many thousands. The scheme we promulgate is for the company to invest in some mine already in full work, or take new ground, and mine on their own account.—*Coromandel Mail*, March 12.

NON DELIVERY OF MINING SHARES.—In the Rolls Court, on Thursday, a lengthy argument took place between the Master of the Rolls and Mr. Roxburgh, Q.C., as to the price to be put upon shares which were contracted for delivery, the contracting party having failed to deliver. In the present instance there had been a contract for the delivery of 2500 fully paid up mining shares. This contract had not been fulfilled, and it was argued on behalf of the defendant that the price to be put upon the shares should not be the figures quoted in the market at the time the contract was broken, but at the time the case was heard in Court—whether the price in the meantime had risen or fallen. But in the precedent quoted the Master of the Rolls pointed out that the price had risen in the meantime, and was, therefore, in favour of the plaintiff. Mr. Justice Lush had laid down that the proper course was to indemnify the plaintiff, and had, therefore, given him the option between the price on the day of hearing and the day when the contract was broken. In this opinion the Master concurred. If the stock had risen the plaintiff could claim the higher price, if it had fallen he might take the price on the original day, but he was not bound to accept a lower figure.

THE GREAT WESTERN COLLIERY COMPANY *v.* TUCKER AND ANOTHER.—Before the Vice-Chancellor, Sir R. Malins, on May 6, this matter came again before the Court on the application by the defendants to have the Bill dismissed for want of prosecution. After hearing counsel for the respective parties (the plaintiffs having stated their intention to proceed with the suit), the Court gave the plaintiff company a fortnight to file replication, or serve notice of motion for decree—in default, the Bill to stand dismissed with costs. The costs of the present application to be paid by the plaintiff company.—Mr. Glasse, Q.C., Mr. Cotton, Q.C., Mr. Pearson, Q.C., Mr. Everitt, Mr. Crossley, and Mr. Plummer were the counsel engaged.

JOURNAL OF THE IRON AND STEEL INSTITUTE.—The second part of the 1873 volume of the "Transactions of the Iron and Steel Institute" has just been issued, and will be of unusual interest to the trade from the fact of its containing the report of the visit of the members of the Institute to Belgium, and not only the papers read at the Liége meeting, but copies of the interesting maps and illustrations which accompanied them. The report of the Progress of the Iron and Steel Industries in foreign countries, by Mr. David Forbes, the foreign secretary to the Institute, is of the usual exhaustive and instructive character. The volume is published by Messrs. Spon, of Charing Cross.

THE HOUSE OWNER'S ESTIMATOR, OR WHAT WILL IT COST TO BUILD, ALTER, OR REPAIR?—The little volume bearing this title, and which is the work of the late Mr. James D. Simon, A.R.I.B.A., is one which is likely to come largely into favour amongst all who desire to make rough yet reliable estimates of the cost of any class of work connected with the building trades, which it is proposed to undertake. The work, which has been carefully edited and revised by Mr. Francis T. Miller previous to publication, and is issued by Messrs. Lockwood and Co., of Stationers' Hall Court, differs from other price books in giving the price of the particular parts of the building complete, and this will be especially valuable to non-professional readers, who can really learn little from the study of a work which merely informs them that sashes cost so much per foot super, to which certain additions must be made for the sash-frames, and so on; but can readily understand the statements that cellar doors hung and with locks complete cost 1*l.* 6s. each; kitchen-doors, 1*l.* 1s. 6d.; bed-room doors, 1*l.* 17s.; and dining room doors, 2*l.* 10s.; that to put a cupboard into a recess 3 feet high will cost 1*l.* 15s.; and that a bed-room window, 3 ft. wide and 5 ft. high, is worth 1*l.* 18s. without the glass, whilst a superior class of window costs from 4*l.* 10s. to 5*l.* The second part of the volume contains excellent abstracts of the report of the Committee of the Royal Institution of British Architects on Dilapidations, of the Metropolitan Building Act, and of the Metropolitan Board of Works Regulations; so that the book is as complete as it is practically useful.

TRAIN SIGNALLING TELEGRAPHS.—The fifth edition of Messrs. Tyer and Company's illustrated catalogue of train signalling telegraphs, arranged under their patents, has just been issued. The inventions have already been largely adopted by railway companies in England, Scotland, France, Russia, and India, and by the Postal Telegraph Department, and in every case has given the utmost satisfaction. The catalogue is well worthy of the perusal not only of railway managers and directors, to whom it is specially addressed, but of all interested in the safe working of railways.

PANORAMIC RAILWAY GUIDE.—That the melancholy character of a long railway journey in England, where one is compelled to sit perhaps for hours in silence because it is not the custom of the country to converse with a fellow-passenger without a previous formal introduction, leaves ample room for the discovery of methods of solitary amusement for railway travellers will be readily admitted; so that Mr. R. KEMP PHILP, in designing his "Panoramic Railway Guide," the second of which, that for the London and South-Western line (just issued by Messrs. Bemrose and Co., of Paternoster-row), may well be congratulated upon having performed a very important service to a large number of persons. By reference to this Guide the traveller can readily learn as much as he desires to know concerning the country and towns through which he may be passing, and that, too, without breaking the necessary silence of the compartment. A diagram of the line occupies the centre of the page, and on each side are sketches of places in the order in which they occur. The traveller to London refers to the page upon which the station he starts from is indicated, and traces the notes, with the objects to which they refer, upwards. The traveller from London, on the other hand, follows the notes and objects in the order of the pages downwards. In this way each of them, by referring to the book, has before him a description of the scene which presents itself through the carriage window, and a mass of information not otherwise obtainable. The author states that his object is to relieve the railway journey of its usual tedium, and render it at once intelligent and interesting; and this object he has thoroughly obtained. By the plan adopted trustworthy information is given at a glance on the many objects of interest that arrest the attention while travelling by rail. Particulars are supplied concerning public buildings, churches, and important residences on either side of the line, with brief notes on their historic associations. Notices of celebrated persons born or buried at or near places passed by the traveller; the botany or geology of the country through which the line passes, if of any remarkable interest; and notes upon agricultural, engineering, manufacturing, or other improvements, if observable from the line; and, in fact, some account of everything worth attention. The guide is well printed, and every care appears to have been taken to make the information given thoroughly reliable, so that it is in all respects deserving of extensive patronage.

TIN-PLATES.—Messrs. WALTERS and REES, of the Derwent Tin-plate Works, Workington, has patented an improved machine or apparatus for "pickling" plates in the manufacture of tin-plates and other manufactures in metals. The improved apparatus consists of a leaden pot for containing the pickling liquor and the articles required to be operated upon; the pot is provided with a suitable hinged cover for preventing any escape of the liquor, and is divided into compartments by leaden divisions, and supported by an iron framing, which is caused to vibrate or rock to and fro on side trunnions.

FOREIGN MINING AND METALLURGY.

Chilian copper in bars, delivered at Paris, has made 80*l.*; ditto, ordinary descriptions, 78*l.*; ditto, in ingots, 85*l.*; English tough cake, 85*l.*; and Corocoro minerals, 80*l.* per ton. At Marseilles, Spanish copper for consumption has been quoted at 80*l.* per ton. Correspondence from Rotterdam states that Banca has remained firm at that centre. Having regard to the small quantity of tin disposable, holders refuse for the most part to accept present rates. Prices for future deliveries have risen successively to 62½ fls. and 63 fls. As regards Billiton, holders have sold more readily at 56½ fls. The Dutch Society of Commerce has announced its next sale of tin for May 29. This sale will comprise 23,300 ingots of Banca; the small quantity offered will, probably, render holders of disposable lots extremely "difficult." Lead has remained quiet, having attracted no great amount of attention. French lead, delivered at Paris, has made 20*l.* 4s.; Spanish ditto, delivered at Havre, 20*l.* 16s.; English ditto, delivered at Havre, 20*l.* 8s.; and Belgian and German, delivered at Paris, 21*l.* 4s. per ton. At Rotterdam, Stolberg has made 12⅝ fls.; Spanish, 12½ fls.; and German, of various marks, 12¼ fls. There has been comparatively little passing in zinc. Silesian, delivered at Havre, has made 22*l.* 8s. per ton at Paris; other good marks, delivered at Havre, have brought 22*l.* per ton. Rolled Vieille Montagne zinc has brought 32*l.* 16s. per ton at Marseilles, with a discount of 3 per cent.

The proprietors of the French blast-furnaces are complaining of the immediate present; the proprietors of the French rolling-mills and forges, while half reassured as to the present, complain of the future, which appears to present itself to them under a sombre aspect. Prices, nevertheless, with the exception of those of pig, are maintained tolerably firmly. Merchants' iron is maintained at 8*l.* 16s. per ton, as well in the Nord as in the Haute-Marne and the Meurthe-et-Moselle, but the price of good refining pig has declined to 3*l.*, and even to 2*l.* 18s. per ton. In the Ardennes the iron trade is stated to be in rather a depressed and suffering condition. The Malfidano Mines Company has announced a dividend of 2*l.* 12s. per share; of this dividend 1*l.* per share was paid in October, 1873.

There is little favourable to report with respect to the Belgian iron trade. There is the same heaviness in the pig-iron market which has for some time past weighed upon Belgian metallurgy generally. Luxembourg coke can be obtained at 2*l.* 14s. per ton—that is, at a price which scarcely represents more than the cost of the coke required to make it in September. The price of iron maintains itself very well a little above 8*l.* per ton, rails being somewhat higher, at 9*l.* 4s. per ton. The Belgian rolling-mills are not without business; almost all of them are at work, and have at least the present secured; the future alone remains covered with clouds. The blast furnaces are naturally the most tried. The disastrous competition of Luxembourg products makes Belgian pig heavy at 3*l.* 8s., and even at 3*l.* 4s. per ton; the consequence is that scarcely a week passes without one or two blast-furnaces being blown out. An adjudication for old iron from the Belgian State lines has taken place this week. The proposals submitted for the transfer of old rails for new rails were made at the average rate of 184 for 100. Old rails were also bought on this occasion from 3*l.* 14s. 4d. to 3*l.* 16s. per ton on English account, and at 4*l.* 18s. 6d. per ton for Belgium. The last-named price puts new rails at 9*l.* 0s. 10d. per ton, which is not too far removed from the rate generally accepted. This may be regarded as a proof that the rolling-mills do not make very great sacrifices to obtain work, and that their condition is a little better now than it was two months since. The inauguration of the Brussels Coal and Metal Bourse is fixed for May 20. The Vieille Montagne Company has announced a dividend of 8s. per share for the year 1873.

There is scarcely anything fresh to report with respect to the Paris coal market; there has been very little business passing in coal in the French capital, and prices, upon the whole, show no more firmness than they exhibited a week since. It is rather at a moment like this the producing basins of the Nord and the Pas-de-Calais might be expected to give the tone to affairs, but at present these basins show more indecision than that which prevails elsewhere. One thing appears tolerably certain—that a revival in prices and in business is still somewhat remote. For the present it must be said that the extraction is reduced, and that the stock of coal on hand is considerable. Nevertheless, some coal mining undertakings realised good profits last year. The Carmaux Mines Company, for instance, has fixed its dividend for 1873 at 3*l.* per share, as compared with 1*l.* 12s. per share in 1872. The Douages Company has also announced a dividend of 12*l.* per share for the past year.

The fall in prices appear to be stopped in the Belgian coal trade. Washed coke of good quality has been selling at Liége at 1*l.* per ton, and is firmly maintained at that price, but ordinary coke is obtainable at 16s. per ton, and even less. The Belle-et-Bonne Colliery Company, at Flénu (Jemappes), will pay, June 20, a dividend for the second half of 1873, at the rate of 6*l.* 7s. 6d. per share. The Bonne Espérance Collieries Company will pay a dividend of 6*l.* 16s. per share for 1873.

For a long time past pig, called spiegeleisen, has been manufactured in the Siegen district from spathic and brown minerals, more or less manganiferous. The pig in question contains from 9 to 13 per cent. of manganese. The most renowned spiegeleisen is produced with charcoal, but it costs a very high rate, and since two railways—the Sieg and the Lenne—have placed the Siegen district in communication with the coal basins of the Ruhr the greater part of the spiegeleisen produced has been made in blast-furnaces worked with coke. Spiegeleisen is especially employed in the manufacture of steel, and considerable quantities of it have been forwarded to England, notwithstanding its very high price, and the considerable transport expenses which have to be provided for in connection with it. For some time past the proprietors of blast-furnaces in the Ruhr district have attempted to substitute for spathic minerals, which cost them a very high price, other manganiferous minerals; and if they had not succeeded in manufacturing true spiegeleisen with these, they have easily succeeded in producing pig of a more or less steely quality, and containing 3 or 4 per cent., or more, of manganese. Now that commerce is seeking for pig adapted to the manufacture of steel, and especially of Bessemer steel, manganiferous minerals are more and more sought after, and they are being brought to Germany from Spain, Algeria, and from every district, in fact, in which they can be found.

MINING IN THE THAMES VALLEY.—The operations during January in the principal mines at the Thames possess more than ordinary interest, for, notwithstanding the fact that there is an apparent decrease in the gold yield of past month as compared with the previous one, there have been resources developed and prospects met with which are not only promising as regards the permanency of the resources of the Thames, but particularly encouraging at the present juncture of affairs. To decrease in the gold yield is accounted for. It does not arise from the poverty of the stone raised but from other causes. The average per ton is an excellent one, but the long-continued draught has dried up the creeks, and brought crushing to a standstill so far as the mills in the creeks are concerned, and in several important mines, such as the Whau, Dixon's Alburnia, and Rose and Shamrock, operations have been on a very limited scale in consequence of the stoppage of the mills. These mines would have contributed largely to the month's yield under more favourable circumstances. The visit of the Premier to the Thames, and the cordial reception accorded to him there, together with the warm approval evinced of the policy of the Government, is sufficiently significant of the state of public feeling on the gold fields. In his speech a comparison was drawn between the condition and probable rich future of the Thames field with the progress and wealth which perseverance and the expenditure of capital in gold mining had effected in Ballarat and Bendigo. He pointed out with considerable force that in the history of quartz mining on the Thames, as in that of other gold fields, seeing how comparatively small an extent of the ground had been explored from which results had arisen, so, too, it was only a legitimate expectation that the vast extent of ground still unexplored would in the future produce not less satisfactory results. Such results have been realised by indomitable perseverance in Victoria, and in the teeth of scientific opinion, which, as at the Thames later on, declared that gold was not likely to be found at great depths. Thus, so called science, which ought to be the handmaid of labour, was made to retard its action, and tended, by creating this opinion, to keep back capital and confidence. But sanguine people were found who believed in deep sinking, and after years of labour on Victorian gold fields, they found their work crowned with success, and the profits which, in these pursuits, such success brings. So might it be with the Thames, where still the law of scientific opinion has been felt like a weight, discouraging distant speculation, although that opinion has received contradiction by repeated evidences of the presence of gold far below the surface. Too much can hardly be said of the importance to the Thames, and generally to the province of Auckland, of following an example like that set by Victoria. The indications which have already presented themselves at the Thames, and with the success which was achieved in Ballarat, ought to operate as encouragements for further action. Suppose that the Imperial Crown should become a success—there are a good many of its shareholders in Great Britain—its success would lead, I believe, to the investment of a very large amount of English capital in the same pursuit in the colony.—*Daily Southern Cross* (New Zealand).

PURSUIT OF GOLD UNDER DIFFICULTIES.—It is said that many of those who went to the gold mines of French Guiana are returning. The fields are 100 miles inland, and it takes 150 miles of paddle-boat travel and a five or six days' journey through tangled undergrowth to reach them; then the gold, which is found in rotten quartz, is in from 2 to 6 ft. of black mud, whence rises an effluvia which no white man can endure, and the water is so poisonous that the natives drink nothing but wine.

*** The following articles were, from an unusual and late pressure on our space, unavoidably omitted from last week's Journal:—

THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coal into and from the port and district of London, by sea, railway, and canal, during April, 1874:—

IMPORTS.

By sea.	Ships.	Tons.
Newcastle	156	105,069
Seaham	14	5,462
Sunderland	83	51,516
Middlesborough	4	1,914
Hartlepool	47	17,255
Scotch	24	5,686
Welsh	4	3,161
Yorkshire	43	10,987
Small coal & cinders	10	3,177
Total	385	204,196
Imports April, 1873	485	216,235

By Railway and Canal.	Tons	c.
London and North-Western	65,469	9
Great Northern	58,363	0
Great Western	38,881	0
Midland	112,606	0
Great Eastern	52,847	7
South-Western	2,396	11
South-Eastern	999	4
Grand Junction Canal	512	5
Total	332,074	16
Imports during April, 1873	426,916	12

Comparative Statement, 1873 *and* 1874.

By Sea.	Ships.	Tons.
Jan. 1 to April 30, 1874	1923	965,054
Jan. 1 to April 30, 1873	1763	922,354
Increase in the present year	155	32,700

By Railway.	Tons.	c.
Jan. 1 to April 30, 1873	1,642,736	0
Jan. 1 to April 30, 1874	1,500,515	0
Decrease in the present year	142,221	0

EXPORTS.

Export List, showing the distribution of coal imported into the port or district of London, by sea, rail, and canal, and afterwards exported coastwise or to foreign parts, or sent beyond limits of London district, by rail or inland navigation, during April, 1874—

Railway-borne coal passing "in transitu" through district		50,689
Sea borne coal exported to British possessions, or to foreign parts, or to the coast	38,582	
Ditto, beyond limits by railway	6,543	
Ditto, by canal and inland navigation	1,719	= 46,844
Railway borne coal exported to British possessions, or to foreign parts, or the coast	29,163	
Ditto, by canal and inland navigation	80	= 29,243
Sea-borne coal brought into port and exported in same ships		3,932
Total quantity of coal conveyed beyond limits of coal duty district during April, 1874		130,708
Ditto, during April, 1873		150,801

Comparative Statement, 1873 and 1874.

Total distribution of coal from Jan. 1 to April 30, 1873	573,037
Total distribution of coal from Jan. 1 to April 30, 1874	523,056
Decrease in the present year	49,981

General Statement, 1873 *and* 1874.

Decrease in coal imported by railway during present year	Tons	142,221
Less increase in coal imported by sea	32,700	
Add decrease in exports	49,681	= 82,981
Net decrease in trade within London district during present year		59,540

THE COPPER TRADE.

The market is now more than ever governed by the fortnightly Chili advices, and as these of late have indicated an increased supply during the current year, they have had a somewhat depressing effect, more, however, in curtailing operations than in cheapening the price. Bars have been as low as 73*l.*, but subsequently rallied to 74*l.* 10s., 75*l.* In Australian the demand has been checked by the holding off the market of the greater supply of Wallaroo, but some considerable quantities of Burra have changed hands for exportation to the East and France, as well as for home consumption, the price of 83*l.* at which it has been sold rendering it, in proportion, the cheapest copper in the market. The importations in the four past months show an increase, as compared with 1873, but exports are only 800 tons less, whilst the stock month by month for the past twelve months shows but little variation. The West Coast charters for the first quarter of 1874 are 13,000 tons, against 9700 tons in 1873. The shipments to March 18 were 10,209 tons, against 8198 tons last year.

The imports of copper into England for the first three months of the following years were—1870, 11,605 tons; 1871, 15,850 tons; 1872, 20,695 tons; 1873, 15,069 tons; and 1874, 19,272 tons. The exports for the same periods were—1870, 14,372 tons; 1871, 7981 tons; 1872, 8041 tons; 1873, 13,309 tons; and 1874, 12,525 tons.

The position from May 1, 1873, to May 1, 1874, was as follows:—

	Price.	Stock on hand.	Stock, including afloat and chartered.
1873—May 1	£88 0 0	....Tons 29,908	....Tons 39,024
June 1	84 0 0	30,912	38,984
July 1	80 0 0	30,634	39,856
August 1	81 0 0	31,607	39,279
September 1	84 0 0	29,983	37,391
October 1	82 0 0	28,637	35,405
November 1	83 0 0	28,645	34,837
December 1	83 0 0	29,141	35,526
1874—January 1	84 0 0	28,593	35,863
February 1	82 0 0	29,682	36,606
March 1	78 0 0	29,643	35,293
April 1	75 0 0	29,500	36,908
May 1	74 0 0	30,648	36,993

And the comparative positions at the same date of the past four years with the present are as follow:—

	Price.	Stock on hand.	Stock, including afloat and chartered.
1870—May 1	£67 0 0	.....Tons 28,623	.....Tons 42,869
1871—May 1	65 0 0	34,817	43,113
1872—May 1	101 0 0	21,435	34,235
1873—May 1	88 0 0	29,908	39,024
1874—May 1	74 0 0	30,643	36,993

Leadenhall-street, London, May 8. HENRY ROGERS, SONS, AND CO.

THE TIN TRADE.

Our Tin Market opened with a dull feeling in the beginning of this month, prices showing a further slight decline, when the low range of prices attracting the attention of operators, a good demand set in for export and also to cover previously made "Bear sales." The few pressing holders having been cleared of their stocks at these low rates and very little tin being offered in the market, a better feeling immediately manifested itself, resulting in a good business at rapidly advancing prices. Much of this advance has, however, been lost during the last week, and there is a very quiet feeling at the close. Banca after reaching 52 fl., has been in active demand and with a limited supply, the price rapidly advanced to 60 fls. In one instance 65 fl. was paid, which rise was caused by the forced buying of some parties for contracts due at the last sales' prompt. The anxiety of holders to realise at this advance upset the market entirely, and the price fell almost without a single transaction from 65 fl. to 56 fl., from which there was a recovery to 59 fl., the market closing with buyers at 58 fl. Contracts for delivery ex May sale changed hands from 52 fl. to 59 fl., there being now sellers at 57 fl. According to advices from Batavia the production of Banca tin in 1873 amounted to 70,000 peculs, against 68,000 in 1872, 67,000 in 1871, 74,000 in 1870, 73,500 average 1862—1872. Billiton has been more enquired for, and the price, after receding to 51 fl., gradually advanced to 58 fl., from which there was a decline to 55 fl., which is the closing price. The arrivals have been unusually large this month. In parcels, to arrive, a good business has taken place; the price improved from 51 fl. to 58 fl., subsequently falling to 54½ fl.; 54 fl.: 9000 peculs Billiton offered in public sale at Batavia on the 13th inst. fetched the average price of 55·70 fl. costing to sell here about 51½ fl. by steamer. Next sale comprising about 8000 peculs is advertised for Monday, June 8. According to an official statement the productions of Billiton tin in 1873 amounted to 51,000 peculs, against 54,300 in 1872. The position of Banca tin in Holland on April 30 according to the official returns of the Dutch Trading Company, was:—

		1874.	1873.	1872.
Import in April	Slabs	5,241	30,046	3,263
Total four months		27,614	85,291	29,393
Deliveries in April		15,837	21,151	10,743
Total four months		50,844	43,852	32,638
Stock second-hand		9,000	65,763	51,829
Unsold stock		102,380	76,641	8,928
Total stock		111,380	142,404	62,757
Afloat	Peculs	14,800	17,700	13,500
Statement of Billiton:—				
Import in April	Slabs	18,800	4,300	5,387
Total four months		22,800	14,750	14,508
Deliveries in April		5,370	1,850	5,606
Total four months		11,570	22,140	12,456
Stock		37,250	7,483	4,808
Afloat	Peculs	10,000	11,544	4,601
Quotation of Banca		58 fl.	84 fl.	97 fl.
April 30 of Billiton		55	83½	95½

These combined returns of Banca and Billiton for 1874 compared with those for 1873, exhibit—A decrease of the import for April of 322 tons; a decrease of the import for the four months of 1551 tons; a decrease of the deliveries for April of 55 tons; a decrease of the deliveries for the four months of 112 tons; a decrease of the stock second-hand of 844 tons; an increase of the unsold stock of 804 tons; a decrease of the total stock of 40 tons; a decline of the quotation of Banca of 42*l.* 18s. per ton.

EXPORT OF TIN FROM HOLLAND.

	February.			Two months.		
	1874.	1873.	1872.	1874.	1873.	1872.
Germany.....Tons	308	172	150	502	476	433
England	—	117	10	27	272	23
Belgium	132	82	95	219	171	254
France	6	25	15	10	46	30
Hamburg	29	21	23	55	36	43
United States	—	—	—	—	—	—
Other countries	6	1	3	19	2	12
Total	481	418	306	832	1003	774

Rotterdam, April 30. EBELING AND HAVELAAR.

AUSTRALIAN TIN ORE SOLD IN LONDON on May 5.

Qnty. cwts.	Price. £ s. d.	Purchasers.
131...	55 10 0	Bolitho and Sons. / Calenick Smelting Co.
42...	51 0 0	Ditto.
50...	53 5 0	Ditto.
30...	46 0 0	Ditto.
100...	54 10 0	Ditto.
100...	54 10 0	Ditto.
100...	54 10 0	Ditto.
85...	52 5 0	Ditto.
21...	55 10 0	Ditto.
52...	56 5 0	Ditto.
121...	51 10 0	Ditto.
84...	54 10 0	Ditto.
84...	55 0 0	Ditto.
200...	56 5 0	...Williams, Harvey, & Co.
128...	56 5 0	Ditto.
114...	54 10 0	Ditto.
8...	47 5 0	Ditto.
14...	19 0 0	Ditto.
144...	56 5 0	Ditto.
59...	54 0 0	Ditto.
100...	56 5 0	Ditto.
60...	56 15 0	Ditto.
120...	56 5 0	Ditto.
22...	51 0 0	Ditto.
184...	56 5 0	...Daubuz and Co.
135...	55 10 0	Ditto.
44...	55 10 0	Ditto.
66...	51 0 0	Ditto.
158...	56 5 0	...R. R. Michell and Co.
200...	56 5 0	...R. R. Michell and Co.
62...	49 0 0	Ditto.
35...	54 0 0	Ditto.
25...	50 0 0	Ditto.
10...	56 5 0	Ditto.
48...	55 0 0	Ditto.
184...	56 5 0	...Tregoning and Co.
14...	55 0 0	Ditto.
136...	54 10 0	Ditto.
70...	54 0 0	Ditto.
50...	27 0 0	...Redruth Smelting Co.
52...	51 0 0	Ditto.
40...	55 0 0	Ditto.
43...	52 15 0	Ditto.
145...	145 0 0	...Charlestown Smelt. Co.
100...	54 12 6	Ditto.
10...	19 0 0	Ditto.
10...	27 0 0	Ditto.
85...	54 10 0	...Tamar Smelting Co.
33...	55 0 0	Ditto.
93...	54 10 0	Ditto.
1...		Withdrawn.
79...		Withdrawn.
39...		Withdrawn.
16...		Withdrawn.
18...		Withdrawn.
35...		Withdrawn.
34...		Withdrawn.
120...		Withdrawn.
42...		Withdrawn.

EACH COMPANY'S PURCHASE.

Bolitho and Sons	Tons 50 0	Redruth Smelting Company	Tons 9 5
Calenick Smelting Company	50 0	Charlestown Smelting Company	19 5
Williams, Harvey, and Co.	48 9	Tamar Smelting Company	10 10
Daubuz and Co.	21 9	Withdrawn	19 12
R. R. Michell and Co.	26 18		
Tregoning and Co.	20 4	Total	219 12

PERUVIAN TIN ORE SOLD IN LONDON on May 5.

Qnty. cwts.	Price. £ s. d.	Purchasers.
33...	45 0 0	Bolitho and Sons. / Calenick Smelting Co.
50...	50 10 0	...Williams, Harvey, & Co.
30...	38 10 0	...R. R. Michell and Co.
55...	37 10 0	...Redruth Smelting Co.

EACH COMPANY'S PURCHASE.

Bolitho and Sons	Tons 1 15	R. R. Michell and Co.	Tons 1 10
Calenick Smelting Co.		Redruth Smelting Co.	2 15
Williams, Harvey, and Co.	2 10	Total	8 10

PERUVIAN TIN ORE SOLD IN LIVERPOOL on May 6.

Tons.	Price. £ s. d.	Purchasers.
9...	35 0 0	Bolitho and Sons. / Calenick Smelting Co.
7...	39 0 0	..Daubuz and Co.
1½...	41 15 0	...R. R. Michell and Co.

Total sold.....Tons. 17 10 cwts.

MINING IN AUSTRALASIA—MONTHLY SUMMARY.

STARTING OF THE HAMLEY NEW ENGINE.—On March 25 an event of great importance in connection with the copper mining interest of the Peninsula consisted in the starting of the new engine lately erected in this rich and rising mine. This was originally the Karkarilla Company, for which sections were surveyed some 13 years ago, or about the same time as the Moonta Mines were started. The first company was obliged to succumb through inability to pay debts and heavy interest incurred in sinking to the depth of 80 fms., notwithstanding excellent ore had been got from the mine, and prospects were of the most flattering character. At this time the mine went a begging for a purchaser for 1000*l.* Now the present proprietary, by means of perseverance and the prospecting of other lodes both east and west of that which is supposed to be the main one, has converted the Hamley Mine into one enjoying the brightest of prospects, which the newly-started machinery promises to consolidate and increase.

STARTING THE GREAT BRITAIN ENGINE.—For some time some sort of occult operations have attracted attention close to the wash of the sea midway between the smelting works and Point Hughes, in Wallaroo Bay. These operations were the planting an engine and the formation of a pumping shaft, with the necessary gear for keeping down the water in the underground works of the Great Britain Copper Mine. All being ready, steam was got up, and in the presence of a number of persons the start was made with unqualified success. The machinery consists of a perpendicular boiler and rotary engine working pumping gear. It is the first piece of mining machinery erected at Port Wallaroo for the first copper mine at Wallaroo, and it was no wonder at the vinous celebration which took place on the wild spot that many hopeful things were said of the chances of the mine, and if successful how beneficial would be the effect upon the interests of the place. The engine, with boiler, was manufactured by Messrs. Dixon and Williams, of Light-square, Adelaide, and is a fine piece of complicated but very serviceable work. All the castings and gear were executed by Mr. T. R. Heath, ironfounder, Wallaroo, and are equally creditable to him as the engine with boiler is to the Adelaide firm.

THE MOONTA MINES.—The half-yearly report of the Moonta Mining Company, which has just been printed, throws some light upon the recent decline in the price of the association's shares. It shows that there has been no diminution worth mentioning in the yield of ore, and that the average percentage has, if anything, been better than for the preceding six months; but it also shows that the cost of raising the produce has been increased, and the value of the ore itself depreciated. This last-mentioned fact is referred to as a subject of regret by the directors, on the ground of its having led to a considerable falling off of profit in the operations for the half-year ending March 20, 1873. On the mines themselves the utmost activity has prevailed. New shafts have been sunk with gratifying results; old shafts have been deepened; levels have been extended, and drives have been pushed out in all directions, promising a very satisfactory return. One shaft been sunk to a deep of 100 fms., and even here the yield is 3 tons of 20 per cent. ore per fathom. It is, therefore, easy to conceive that there is still to be removed an enormous body of ore within the range of the present workings. To convey an idea of the magnitude of the operations Mr. Hancock, the manager, mentions that throughout the mine the skiproads at the respective winding shafts are unitedly nearly one mile in length; that the tramroads in the various drives exceed 3½ miles; and that the ladder ways for ascending and descending are about 3¼ miles. Added to this it is noted that there are at present in the company's employ no less than 1514 persons; including 18 officers, 940 miners, 70 mechanics, 257 labourers, and 226 boys, at the mine, and three officers in Adelaide. Directly or indirectly, however, the property may be said to be the main support of 10,000 or 12,000 people. Coming to the figures, we find that there have been raised during the six month 9178 tons of 22 per cent. and 2450 tons of 4½ per cent. ore, the latter known as slimes. To this aggregate of 11,628 tons has to be added 2659 tons on hand on Sept. 20, making the quantity available for sale 14,287 tons. Of this, however, only 11,292¼ tons have been disposed of, leaving a balance to the good of 2995 tons. The proceeds of sales of ore have reached 122,614*l.*, and the working expenses 90,592*l.*; but inasmuch as the amount of produce remaining on hand exceeds by 338 tons the quantity standing over at the date of the last balance, the operations show a better result than the difference between those two totals. The fact is the net monetary receipts over expenditure only serve to pay two quarterly dividends of 16,000*l.* each. The estimated worth of the buildings, fixed machinery, and so forth, is 116,808*l.*, and the ore on hand is reckoned as being likely to realise 41,930*l.* This latter is, of course, an asset that is immediately available, and there is also owing from sundry debtors 10,059*l.* Against that there are liabilities to sundry debtors which absorb 42,243*l.*, and outstanding claims due to workmen which amount to 3500*l.* It will thus be seen that at the present price of copper the directors have about as much as they can do to make both ends meets, whilst paying a dividend of 10s. per shares four times a year. The probabilities, however, are in favour of a rise, and every pound a ton added to the price of produce means a clear gain of a thousand or two sterling to the proprietary.—*South Australian Register*, March 28.—[Notwithstanding the effect of the low price of copper, we see the market value of the shares of this mine, on which no money was paid up, is 617,600*l.*—ED. *M. J.*]

AUSTRALIAN MINES.

PORT PHILLIP AND COLONIAL (Gold).—Clunes, March 24: The quantity of quartz crushed during the month ending February 25 was 4334 tons; pyrites treated, 27 tons; total gold obtained 1083 ozs., or an average per ton of 4 dwts. 11½ grs. The receipts were 432*l.* 12s.; payments, including 136*l.* paid on account of firewood and mine timber, 467*l.* 9s.; loss, 34*l.* 17s., which, deducted from last month's balance of 1205*l.* 7s. 7d., left an available balance of 858*l.* 10s. 7d., which was carried forward to next month's account.

Telegram.—Melbourne, May 12: "Month ending April 22—yield per ton, 4 dwts."

ANGLO-AUSTRALIAN (Gold).—Captain Raisbeck, March 24: Prospecting Shaft: On the 24th ult. I engaged two men to break quartz in the north stopes. They worked eight days; but, their labour not giving satisfaction, through the position of the workings, I discharged them. In the meantime, I commenced to drive north from the shaft, with two men, on the same quartz, but 20 ft. deeper. We have driven 40 ft., broken and crushed 28 tons, the result being 9 ozs. 5 dwts. of retorted gold; we have 30 ft. more to drive, when we shall break the stones much cheaper. The stopes will be easier of access, and a good level to pass through.

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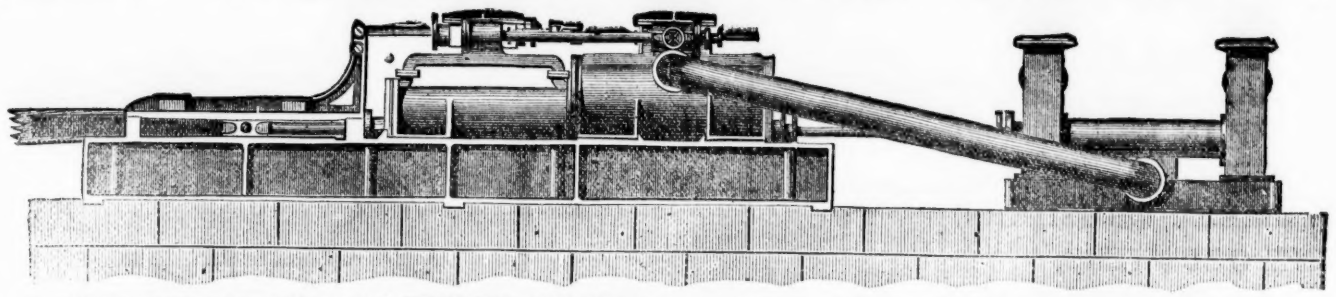

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EXTRACTS FROM TESTIMONIALS RECEIVED:—

Mr. C. E. BAINBRIDGE, of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 27th September, 1873, says—"After a full season's experience of the very complete Dressing Machine erected by you at our Colberry Mines, we are fully satisfied with our decision to adopt your patents in preference to all others. The machinery does its work as well as we can desire, and better than we anticipated. We are now getting through 70 tons of orestuff per day, of rich quality. Without your machinery we should have been at a standstill, for we cannot get hands to supply our wants elsewhere. It saves fully one-half of the old wages, and vastly more on the wages we now give, and the saving in ore is not much short of 10 per cent. You can quote from this letter as you think proper."

Mr. COULTAS DODSWORTH, of Haydon Bridge, writes, on the 15th January, 1874:—"I have just returned from the Stonecroft and Greyside Mines, where I have seen your 'Patent Ore Dressing Machinery' at work, with which I must say, I was highly pleased. It is decidedly the best machinery I have ever seen for the purpose, the results being as near perfection as possible, and I am quite sure its use in this case will be a very great saving to the company. No large mining establishment should be without your machinery, especially when labour is difficult to procure—a mere fraction of the hands being only required as against the old system, and the work altogether much better done, and a great saving of ore effected. I have heard it said that your machinery is better adapted for poor than for rich ores, but from what I have seen to-day I am quite confident it will do for any kind of ores. I beg not only to congratulate, but also to compliment, you on the great success of your 'Patent Ore Dressing Machinery.' You may use this letter as you think proper."

Mr. MONTAGUE BEALE, Managing Director of the Cagliari Mining Company (Limited), says, on May 15th, 1873:—"I have much pleasure in speaking of the great efficiency of your 'Patent Dressing Machinery,' as erected by you at our mines at Rosas, in the Island of Sardinia. You will remember it has always been considered impossible to dress, or rather separate, the minerals our ores contain by machinery, but our captain assures me he gets a constant return of 76 per cent. of lead with the greatest ease, and I know by the returns we are realising the best market price. I consider this company is much indebted to you for the success you have achieved at so small cost. It may interest you to know, from my experience in several of the British possessions, including the whole of the Australian Colonies, that my opinion is I have never seen any dressing machinery that can efficiently, and at so small a cost, dress, and separate metallic ores, however close the mechanical mixture may be, as yours. You can use this letter in any way you like."

The most satisfactory testimonials also have been received from the GREENSIDE MINE COMPANY, Westmoreland: the TALARGOCH MINING COMPANY, North Wales, and others. Copies of these may be had from Mr. GREEN.

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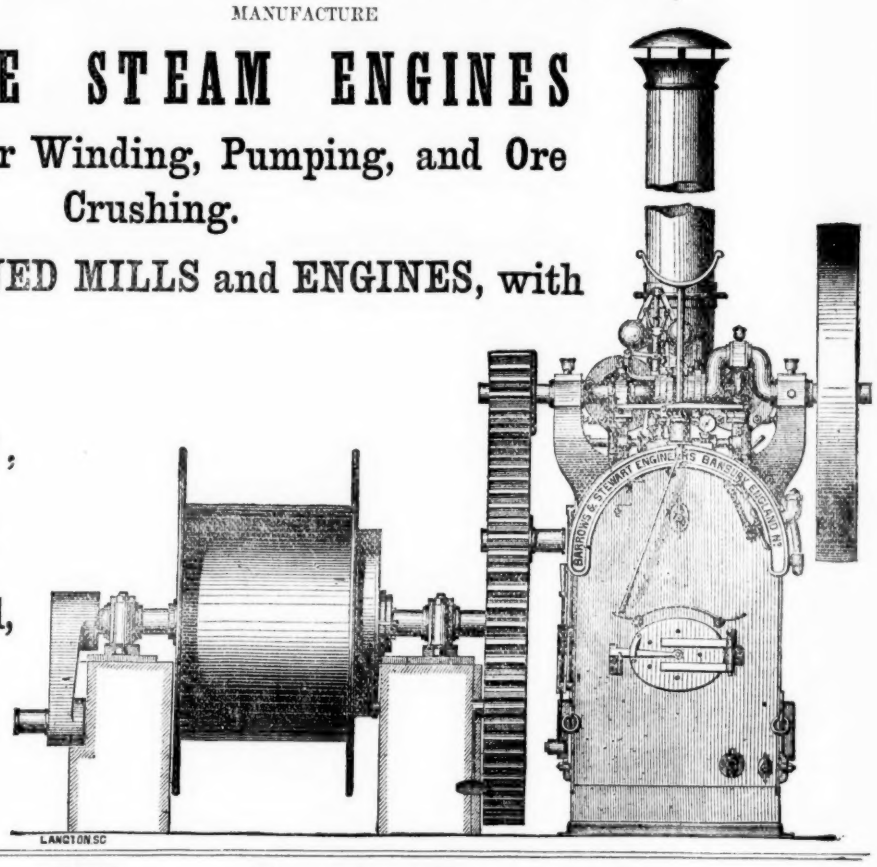

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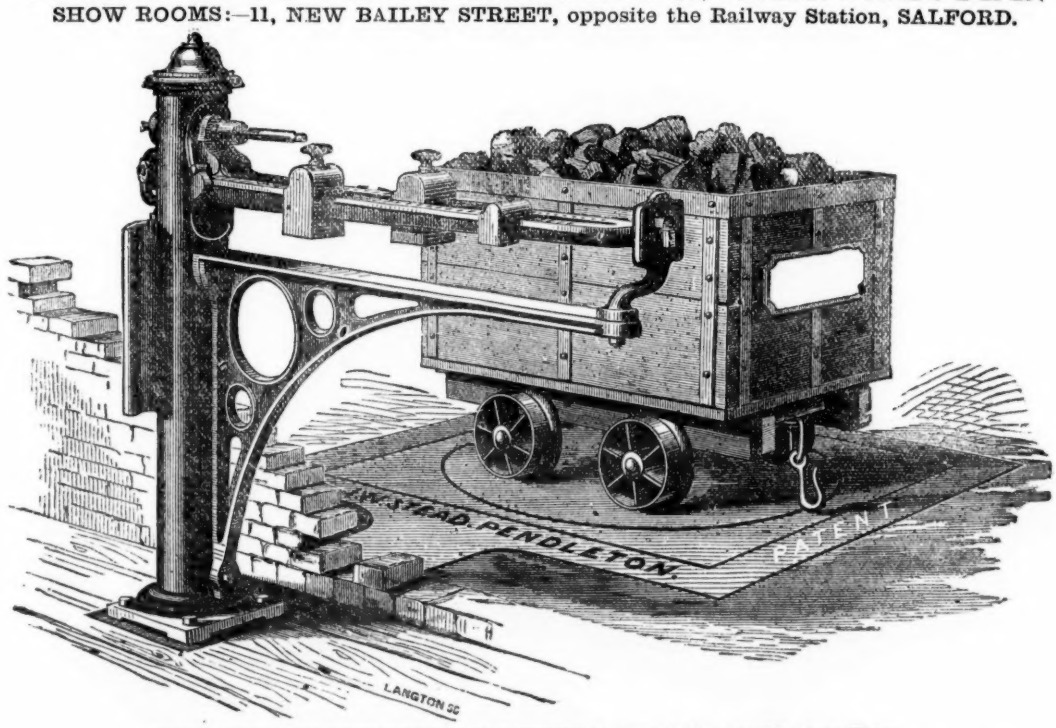

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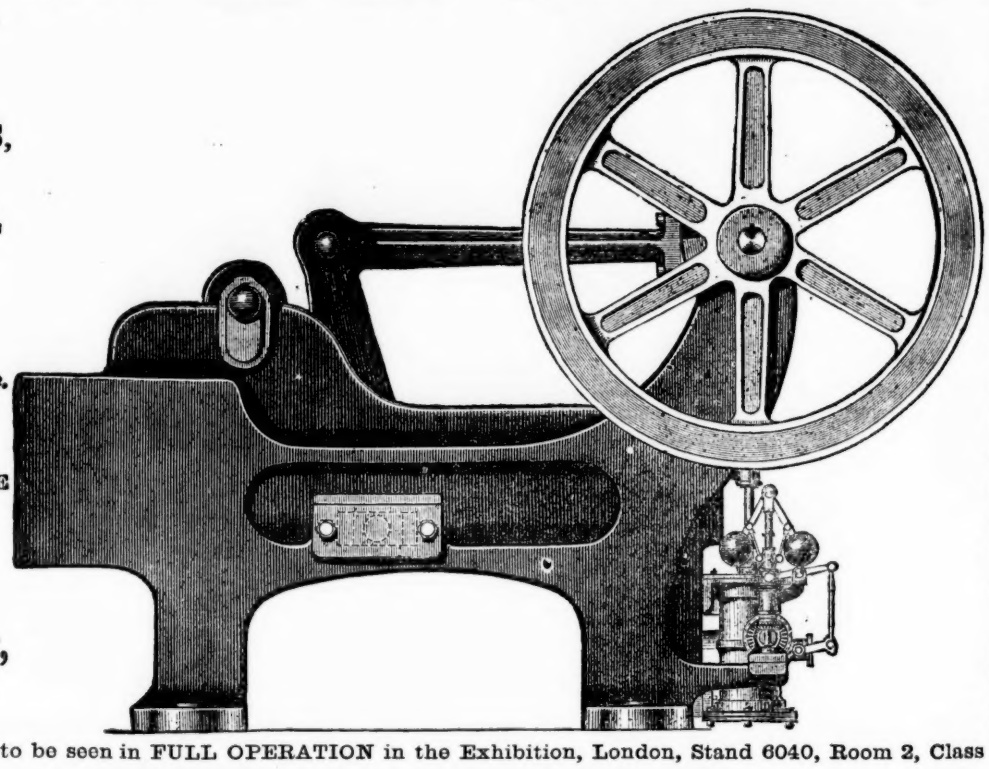

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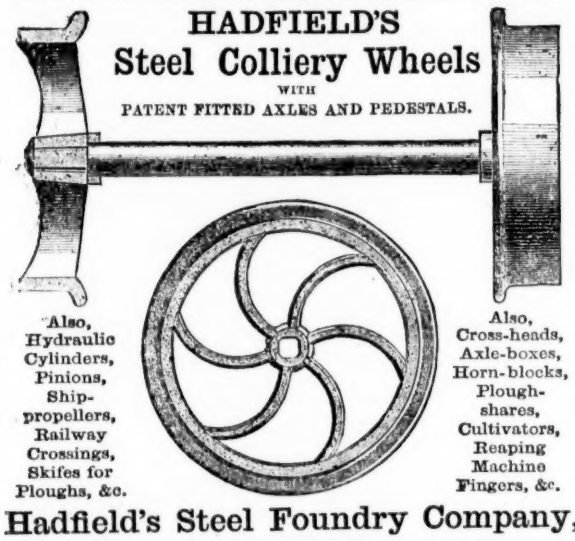

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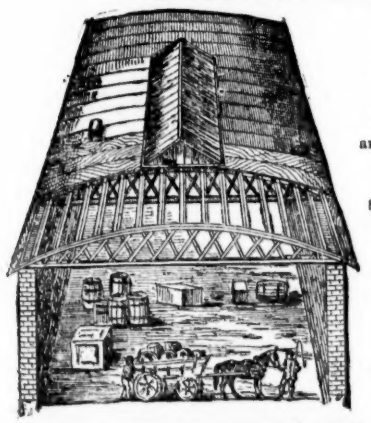

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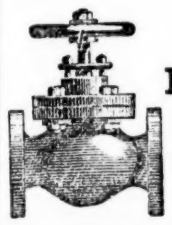

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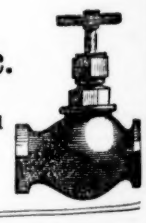

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